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MR. PRESIDENT, FELLOWS, AND GENTLEMEN,—In this second lecture I desire first to direct your attention to certain experiments on the source of available calcium in the bones. Then I shall give an account of generalised osteitis fibrosa, stating the evidence for regarding it as due to hyperparathyroidism; and this in turn will be followed by a discussion of the effects of thyroxin and thyroid disease on calcium metabolism and of hyperthyroidism on the bones.

THE SOURCE OF AVAILABLE CALCIUM.

Studies of the metabolism during fasting[50] show that the only fixed base which is drawn from body tissues is calcium. Thus, in starvation, sodium and potassium are retained, whereas calcium is excreted continuously from the bones. Is the mechanism which protects the sodium and potassium of the tissues sufficiently perfect to spare the bone in such a way as to leave its function as a supporting structure unimpaired? Certain experimental, radiological, and pathological evidence suggests that it is—suggests, in fact, that the spongiosa of bone acts as the storehouse of readily available calcium, and that the corticalis is at first spared in the process of calcium mobilisation.

This storehouse was first suggested to us by a series of experiments[23] on the treatment of lead poisoning. Aub and others[51] had shown that in chronic lead poisoning there was a striking parallelism between the metabolism of calcium and that of lead. Since lead is stored in the bones, we used parathormone in an attempt to secure its elimination along with calcium. Periods of treatment by parathormone were separated by intervals in which the patient was given a high calcium diet. The effect of the parathormone, when first given, was to cause a considerable excretion of calcium and of lead. On the second occasion the parathormone still produced its characteristic effect on the blood and more than doubled the calcium excretion, but it caused no excretion of lead. Now, since the patient had been removed from the source of exposure to lead, the inference from this experiment is that a readily available store of calcium contaminated by lead was depleted by the first treatment and was then replaced by a store of calcium during the period of high calcium intake. The second treatment then depleted the storehouse of calcium alone.

Effect of Parathormone on Bones.

Experimental observations on this problem were then made by Bauer, Aub, and Albright[52] working with rabbits and cats. Rabbits were injected with parathormone in increasing doses until they were receiving eight units per day. After 91 days they were killed together with controls. Each rabbit had received approximately 500 units of parathormone and this had raised the serum calcium to about 15 mg. per 100 c.cm. Radiograms showed diminished density of the bones compared to the controls. The long bones, when sawn longitudinally and incinerated, showed that a great number of trabeculæ of the spongiosa had disappeared, but no gross change could be seen in the corticalis. No histological observations were made, and these experiments should certainly be repeated in order, not only to discover whether the corticalis is intact as judged by the microscope, but also to determine the histological mechanism of the calcium depletion. According to histological evidence given below the mechanism of calcium depletion in hyper-parathyroidism in man is a lacunar resorption by osteoclasts.

Effect of Calcium Content of Diet on Bones.

In cats changes in the spongy bone were brought about by diet alone. Five cats were placed on a high calcium diet consisting of milk, and four on a low calcium diet consisting of meat, fresh uncooked liver, and water. At the end of several months the left foreleg was amputated at the shoulder-joint, and the diets were reversed. After a similar period of time the animals were killed, thus allowing comparison of the humerus representing the period of high calcium diet with that of the period of low calcium diet. In this ingenious manner each animal served as its own control, and factors such as age, sex, activity, and season did not enter into the results obtained. These experiments showed that the trabeculæ of spongy bone in adult cats are diminished on a low calcium diet and increased on a high calcium diet. The authors state that "no gross change in cortical thickness was demonstrable." The histological nature of this resorption and apposition of bone was not investigated.

Madder Experiments on Growth of Bones.

The next experiments take us back more than 350 years to Antonius Mizaldus,[53] who first noticed the red colouration of the bones of animals fed with madder. This phenomenon was not known in England until the year 1736.

In the summer of that year a young surgeon, John Belchier, was entertained to supper by a calico printer in the City of London. His host was economical in his affairs and was in the habit of feeding his pigs on the madder-soaked bran from his dye-vats. The result was that Belchier noticed that the pork served at table contained bone dyed red. Immediately afterwards he began experimenting on hens by forcibly feeding them on madder. One died after 16 days, and he found the bones, even those of the densest structure, stained deep red.[54]

The osteogenetic function of the periosteum was discovered by du Hamel[55] using this technique. He fed birds and animals alternately on madder diet and on ordinary food. He then demonstrated in the bones successive red and white layers or rings, the area formed latest being on the surface of the bone immediately under the periosteum. Only bone freshly deposited during the madder feeding was stained bright red, though all bone might assume a pale pink colour.

In 1764 John Hunter used the method to prove his theory of bone growth. He fed growing animals on a madder diet for a month, then killed some of them, and kept the others for a further month on ordinary diet. Twenty preparations from these experiments are preserved in the Museum of the Royal College of Surgeons in London. Unfortunately the colour has faded from them, though some paintings[56] have survived in better condition. Examination of these paintings, especially those of the mandible of a pig, fully bears out his statement[57]: "In the formation of a bone, ossification begins in a spot and gradually increases. By feeding an animal on madder, it is shown that, while bony matter is deposited on the outside of the bone, the absorbents are removing it

from the inner side, otherwise the bone would become heavy and clumsy, and unfit for motion; therefore, as the bony matter which was deposited becomes useless, nature removes it by absorbents."

Now the colour-bearing substance of madder is a glucoside of alizarin, and in recent years experimenters have used alizarin in place of madder. For intramuscular or intravenous use in animals sodium alizarin sulphonate has been used, since it is more soluble.

Madder Experiments on Source of Available Calcium.

Bauer, Aub, and Albright[52] used the dye as a method of tracing the deposition of calcium following a prolonged period of calcium deficiency. Unlike previous experimenters with madder they were not studying the process of growth, and they therefore worked with adult animals. Nine cats were kept on a low calcium diet for 82 days. It was thought that this was long enough to deplete the spongy bone of its trabeculæ. The cats were then placed on a high calcium diet and sodium alizarin sulphonate was given by intramuscular injection. After varying lengths of time on this treatment the cats were killed and their bones sawn longitudinally and cleaned by digestion in pancreatic solution at pH 8·3 for 36 hours. The bones of six cats killed on the fifty-fifth day of the high calcium diet showed the trabeculæ of the spongiosa stained deep red while the corticalis showed no trace of the dye. This suggests that the calcium stored on the high calcium diet was deposited in the spongy bone, and that the corticalis had not been depleted by the low calcium diet.

In the light of these experiments, the effect of parathormone in our patients with lead poisoning[22] is explained. The first treatment by parathormone depleted trabeculæ contaminated by lead, the period of high calcium diet reconstructed the spongy bone by calcium deposition, and the second treatment by parathormone caused an increased excretion of calcium, but none of lead, from this new deposit.

A further aspect of this question is of practical clinical importance. With this reserve supply of calcium readily available it should be difficult to remove abnormal calcium deposits in the body. This has proved to be the case with myositis ossificans, which is unaffected by parathormone therapy.[8] What is much more unfortunate is that Aub and Crockett[55] in a series of cases of otosclerosis have failed to improve the acuity of hearing by injections of parathormone, although many grammes of calcium were eliminated from the body.

My next task is to inquire whether there is any counterpart in human pathology to the depletion of skeletal calcium which occurs after prolonged administration of the parathyroid hormone.

This search will take us back to the pioneers of morbid anatomy. In the light of modern biochemistry their excellent work assumes new importance and should serve to remind us that our so-called physiological approach to medicine can only survive as long as we base it on the careful study of morbid anatomy.

Generalised Osteitis Fibrosa of von Recklinghausen.

The term generalised osteitis fibrosa indicates a disease entity which I believe to be distinctly different from focal osteitis fibrosa. In the latter there may be one or more focal lesions, the essential point being that outside these lesions we have evidence that all bony tissue is normal. In the generalised disease there is widespread pathological resorption affecting all the bones. In addition there are multiple foci of osteitis fibrosa with or without benign giant-celled tumours and cysts. It is a disease which progresses with pain, fractures, and disabling deformities and is usually fatal. The history of the generalised disease follows.

In 1877, close upon the discovery of osteitis deformans, von Langendorff and Mommsen[59] described the case of a man of 39, thought to be suffering from osteomalacia, but whose bones at necropsy showed softening, multiple fractures, and cysts.

In 1886 Virchow[60] described a case of bone disease showing "tumours and cysts with curving of the femora and porosity of the ribs." In 1889 Hirschberg[61] described a generalised skeletal disease which he separated only imperfectly from osteomalacia. In a Festschrift written in 1891 in honour of the seventy-first birthday of Virchow, von Recklinghausen[62] gave the first accurate description of the disease entity which now goes by his name. His contribution to the Festschrift is very involved, for he describes more than one bone disease. There can be no doubt, however, that his Cases 5 and 7 constitute the discovery of generalised osteitis fibrosa. It is important for us to notice that he went to the trouble of describing two cases of puerperal osteomalacia (Cases 8 and 10) in order to place on record that "so many facts differentiate Case 7 from true osteomalacia."

Case 5 of von Recklinghausen. Extensive fibrous or deforming osteitis with tumours and cysts.—A woman of 66 died of pneumonia, history unknown. Deformities of both femora. Cysts and fibrous areas in femur, tibia, humerus, ulna, occipital bone, and in a few short bones. "There is so little osteoid tissue, the soft connective tissue is so rarely rich in cells, and the cyst wall so resembles old sclerotic connective tissue that we conceive the whole process as an arrested phenomenon, finished years ago."

Case 7 of von Recklinghausen. Osteitis fibrosa with marked bone softening and multiple osteosarcomata.—A man of 40, thought to be suffering from osteomalacia, had fallen from a ladder and fractured neck of femur 18 months before. Six months later spontaneous fractures of clavicle and opposite femur. Severe bone pains. Bowing of humerus, femur, and tibia. Became bedridden and emaciated, and died of exhaustion.

Necropsy: Femora show S-shaped deformity and are bendable. Pelvis beak-shaped. Brown-red projecting tumours (giant-celled myeloid tumours) in fibula, iliac crest, rib, upper and lower jaws. "With a saw the bones cut like rotten wood, the shafts can be cut with a knife using moderate force. The bone cortex is yielding and is everywhere finely porous. Thorough transformation of the essential bone tissue has affected nearly the whole of the spongiosa in all the bones of the trunk and long bones, but has been limited to just a few bony spicules in the feet. Although the new tissue is much behind the normal bone tissue in solidity, it appears perhaps more as an incomplete bony substance and might be described as a tough connective tissue which is in that state which precedes bone. These are the real causes which have led me to the designation osteitis fibrosa osteoplastica."

In our subsequent knowledge of this disease there is ample clinical and pathological evidence to establish the benign nature of these giant-celled tumours. The cells themselves are similar to the osteoclasts normally present in Howship's lacunæ.

Thirteen years after von Recklinghausen first described generalised osteitis fibrosa, an important step was made towards solving the problem of its ætiology. This was the description by Askanazy[63] in 1904 of a case of generalised osteitis fibrosa associated with a parathyroid tumour.

Askanazy's case with parathyroid tumour. Deforming osteitis without osteoid tissue.—Woman, aged 51, complained of pains in limbs. There had been a spontaneous fracture of the femur seven months before. This was treated for five months but remained ununited. On an attempt to put the limb in plaster a spontaneous fracture of the tibia occurred. A month later the opposite femur was found to be fractured. There was great wasting, and the patient died from exhaustion.

At necropsy "to the left of the left thyroid lobe there is a soft tumour (4·5 by 2 by 2 cm.) which looks almost like a second left thyroid lobe. Histologically it is markedly different from the thyroid and consists of narrow strands of cubical epithelium. Nowhere is there formation of colloid. One must think of a parathyroid origin of this tumour." Calvaria easily compressed like a thick mass of rubber; thin sections are easily obtained with a razor. Pelvis heart-shaped. Femur fractured in three places; a knife easily penetrates it. Ribs, sternum, and vertebræ easily compressible; thin corticalis and wide-meshed spongiosa. Microscopically there is "an alternation of

deposition and destruction of bone. We entirely failed to find osteoid tissue. Nowhere did halisteresis form part of the disappearance of old bone. The process of destruction of old bone is carried out by numerous osteoclasts lying in Howship's lacunæ. Sometimes one sees a small bony particle surrounded by giant cells, and finally only the osteoclasts, single or in groups, free in connective tissue."

Since its significance was scarcely suspected, the parathyroid tumour mentioned by Askanazy in this case passed unnoticed. However, the description by Erdheim [64] in 1907 of three cases of osteomalacia associated with enlargement of the parathyroids called forth many other observations of bone disease associated with hyperplasia or tumour formation in the parathyroid glands.

In 1925 Hoffheinz,[65] rejecting all cases where the enlargement of the parathyroids was indefinite or inadequately described, collected from the literature 45 cases with *measurable* enlargement of one or more parathyroids. Of these, 27 were associated with definite bone disease, including 17 of generalised osteitis fibrosa, 8 of osteomalacia, and 2 of rickets. Sometimes more than one parathyroid gland was affected. He quoted increases of size up to 7 by 2·5 by 1 cm. The histological changes were either those of hyperplasia or of adenoma.

Prof. H. M. Turnbull has kindly allowed me to quote from his records of 1917 the following case:—

CASE 3. *Generalised osteitis fibrosa with parathyroid adenoma.*—A man of 66 years (L. H., Reg. No. 15265, 1916). Patient was a retired police officer. For two years he had been to some extent disabled by pains in various joints and was told he had rheumatoid arthritis. For three months he had had attacks of acute pain in the left thigh. On the day of admission, while sitting on his bed, he heard a snap and noticed his left leg drop. Examination showed a spontaneous fracture of the left femur at the junction of the middle and upper thirds. No deformity was noticed in the skull or other bones. Radiograms of the left femur showed "atrophy of bone" with fracture through a cystic area. Two weeks later, while tying a parcel, the patient broke the proximal phalanx of the right middle finger. Three days after this accident death occurred from pulmonary embolism.

Necropsy (P.M. 1/1917). Prof. H. M. Turnbull. *Pulmonary embolism; thrombosis of left iliac veins; osteitis fibrosa diffusa with cysts and small red tumours; parathyroid adenoma.* Œdema and chronic emphysema of lungs. Quiescent tuberculosis: calcareous nodules in lower lobe of left lung and gland of tracheal bifurcation. Hypertrophy of urinary bladder. Adenomyoma of prostate. Tubular adenomyoma in ileum. Considerable general atheroma. Atrophy of thyroid, liver, kidneys, spleen, testicles, and frontoparietal cortex.

Right superior parathyroid body. Macroscopic.—The gland was enclosed in a fibrous capsule, measured 2 cm. in diameter, and was attached to the back of the upper pole of the right lobe of the thyroid. On section it felt gritty, and clear fluid escaped from a yellowish cut surface.

Microscopic.—The capsule consists of collagenous tissue, which is mostly hyaline and extensively calcified. In clefts in the capsule and in the areolar tissue outside it are a few glandular acini. Within the capsule the glandular tisaue is traversed by capillary and larger vessels, with swollen walls of hyaline collagen. Calcium frequently impregnates the wall and converts many vessels into calcareous trabeculæ or laminated spheres. In places the glandular tissue is definitely acinar, rows of single cells enclosing round or oval lumina; usually the cells are in masses interrupted by many small clefts and spaces, or form anastomosing trabeculæ which enclose large irregular or symmetrical spaces. The lumina and spaces contain threads or sheets of albuminoid coagulum. The cells are usually polygonal from mutual compression, and measure about 12 micra in mean diameter. Their cytoplasm is faintly acidophil, granular, and vacuolated; cell membranes usually form a sharp line between adjacent cells. There are a few smaller cells, with more homogeneous cytoplasm and pyknotic nucleus. Preparations to demonstrate fat and glycogen were not made.

Remarks.—The fact that part of the gland lies in and outside the capsule suggests that the whole gland was not equally affected. This is possibly in favour of benign neoplasm as against functional hypertrophy.

Bones. Macroscopic.—Paired cysts above centre, and immediately below centre of left femur (Fig. 4A).* Single cyst in outer condyle of left femur, and in tuberosity of right humerus. Multiple cysts in proximal phalanx and in metacarpal of right middle finger. Fractures through cysts in centre of left femur and proximal phalanx of right middle finger. Areas of red tissue in spongiosa of third right metacarpal, and (2·5 by 2 cm.) in inner condyle of left femur; nodule of firm yellow and grey tissue expanding third right rib (Fig. 4C); red and grey tissue in medulla of left femur below fracture; nodule of red tissue containing small cysts and expanding sixth right rib (Fig. 4B). Nodule of closely meshed, stout-trabeculated, spongy bone slightly expanding the third left rib; nodule of closely meshed, delicate, spongy bone surrounding small areas of red tissue and expanding ninth right rib. Similar compact spongy bone in medulla of third right metacarpal and in bodies of lumbar vertebræ, most extensive in fifth. Coarse grey trabeculæ (bone bordered by fibrous tissue) in spongiosa of sternum, ribs, and necks of femora. Great resorption of spongiosa and corticalis in sternum and ribs. Porosity of corticalis, almost complete resorption of trabeculæ in medulla, and great reduction of spongiosa in femora and humeri. Thin calvaria of close spongy bone. Fragility of ribs. All bones gritty. Anterior curvature of cervicothoracic spine. Depression in thorax along anterior axillary line; Harrison's sulcus. Excess of red marrow in femora and humeri; red marrow in vertebræ, ribs, and sternum.

Microscopic.—Portions from the margins of the cysts in the left femur and right humerus, from the medulla of the upper extremity of the shaft of the right humerus, and the nodule in the third right rib were embedded without decalcification; portions from the other three expanded ribs, the relatively normal fifth right rib, and the body of the fifth lumbar vertebra were lightly decalcified in nitric acid; portions of the lower end of left femur, with red nodule, the manubrium and sternum were decalcified in formaldehyde followed by Müller's solution. Sections were stained by Kossa's and other methods.

Fibrous tissue is found about the cysts and throughout the soft and bony nodules described above; throughout the area of abnormally dense spongiosa in the fifth lumbar vertebra, and within eroded spaces in trabeculæ and round several trabeculæ in its more normal spongiosa; in places beneath the periosteum, within eroded spaces in the corticalis, on portions of the inner surface of the corticalis, and ensheathing medullary trabeculæ in the manubrium, sternum, relatively normal fifth right rib, and the portions of the other ribs that are beyond their expansions; it even ensheaths the few remaining fragments of trabeculæ in the marrow of the upper part of the shaft of the right humerus.

The fibrous tissue consists of spindle fibrocytes, with long fibro-glia fibrils, in a matrix of abundant collagenous fibrils. It varies considerably in density and cellularity, but is in general uniform and well differentiated. Vessels are usually numerous and resemble in structure those in the unaltered marrow, except that the capillaries tend to be wider. In the centres, however, of the larger areas of fibrosis that are free from bone, the capillaries are small and scanty. Here there is a peculiar patchy degeneration, characterised by extravasation of red corpuscles, deposition of fibrin, and fibrinous imbibition of fibrocytes and of collagen fibres. This change characterises the "red tumours." Other changes in the neighbourhood of the cysts are œdema, hæmorrhage, and dilated capillary spaces containing few or no red corpuscles. Groups of cells loaded with iron are frequent, especially in yellow areas. The cysts have almost invariably an even margin, lined with flattened cells. The wall of the largest consists of dense hyaline collagenous tissue; in the others it is not specialised, but sometimes is hæmorrhagic or contains a zone of osteoclasts or of delicate trabeculæ of coarsely fibred bone. Most of the red areas of fibrinous degeneration contain very numerous osteoclasts, and resemble osteoclastomata. Elsewhere osteoclasts are seldom numerous except near bone.

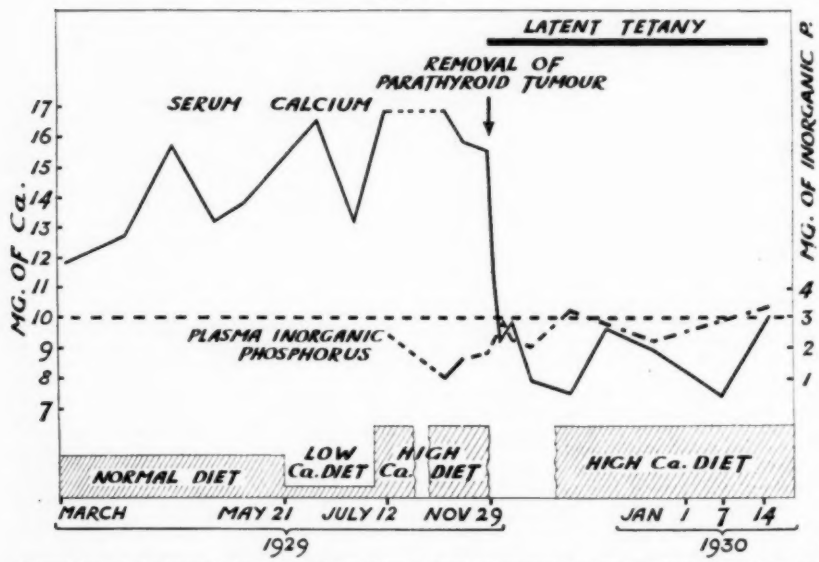
The areas of abnormally dense spongiosa in the ribs and lumbar vertebra consist almost entirely of coarsely fibred bone, and of lamellar bone deposited upon cores of coarsely fibred bone. Active deposition is shown in places by osteoid zones covered by osteoblasts, but there is also much active resorption by osteoclasts in Howship's lacunæ. In the remainder of the spongiosa of the lumbar vertebra there are a few small deposits of coarsely fibred bone and a very few osteoid zones covered by osteoblasts. The predominant feature here is resorption of old lamellar bone. Past resorption is shown by replacement of Haversian canals by wide spaces within trabeculæ and by the tenuity and the eroded surfaces of the trabeculæ. Active resorption

* In the Museum specimens from which the painting was made the posterior and anterior upper fragments of the fractured and bisected femur have been mounted respectively upon the anterior and posterior lower fragments.

is shown by numerous osteoclasts in lacunæ. In the manubrium, sternum, fifth right rib, and the other ribs beyond their focal expansions, formation of new bone is still less, and past and present resorption is greater. The corticalis has been extensively converted into substantia reticularis or has been reduced to a thin shell. The spongiosa has been reduced to a few attenuated "mouse-eaten" trabeculæ. In the spongiosa of the upper end of the shaft of the humerus the trabeculæ are reduced to a few small fragments. The depth of the osteoid zones is seldom greater than in the ribs of newly born infants and is never greater than in healing fractures in healthy adults.

Remarks.—There is a widely disseminated fibrosis of the type found in osteitis fibrosa. Coarsely fibred bone of the kind met is abnormal in an adult. It has, therefore, been formed during the disease. Further, coarsely fibred and lamellar bone were being formed at the time of death. Consequently, formation of bone is a feature of the pathological process. Abundant formation of new bone, however, is found in only a few focal areas, and here it has been preceded by complete, or almost complete, resorption of normal bone. In the skeleton as a whole resorption before, and at, the time of death preponderates enormously over apposition. Resorption is the characteristic feature. The depth of the relatively few osteoid zones that are present is within the limits of the normal. There is, therefore, no histological evidence of the cessation of calcification which characterises rickets and osteomalacia, nor of a removal of calcium by chemical solution. The reduction of calcium in the skeleton is due to the lacunar resorption of calcified bone by osteoclasts. (H.M.T.)

FIG. 6.



Chemistry of the blood in hyper-parathyroidism: effect of removal of parathyroid tumour (Case 4). The blood was examined at intervals for nine months before and for two months after operation. The low calcium diet was that given during the investigation of the calcium balance. The high calcium diet was unweighed. It included four pints of milk daily, together with ice cream, cheese, and eggs. The presence of Chvostek sign has been charted as latent tetany.

Relation of Parathyroid Tumour to Changes in Bone.

Meanwhile there was a difference of opinion as to whether the parathyroid tumour was primary or secondary in relation to the bone disease. Erdheim[64] himself defended the view that the disease of the skeleton was the primary factor, and that skeletal decalcification created such a demand for calcium that a compensatory hypertrophy of the parathyroids occurred. Against this is the fact that, in generalised osteitis fibrosa, hypertrophy or tumour formation is almost always confined to one parathyroid, whilst the others remain normal. It is true that Klemperer[66] has recorded a case of a parathyroid tumour associated with secondary carcinomatosis of bones. Here the skeletal decalcification seems to be a primary factor and the parathyroid tumour secondary, but this association must be rare and is possibly a coincidence. On account of Erdheim's investigations the question was repeatedly discussed at scientific meetings in Vienna.[67] As early as 1915 Schlagenhaufer, at such a meeting, raised the question as to whether it was not justifiable to attempt the extirpation of a parathyroid tumour in cases of generalised osteitis fibrosa. Maresch supported this suggestion, but it was not until ten years later that Mandl[68] of the Vienna school first performed this operation. In view of the Vienna controversy, it is of great interest that he decided to explore the neck only after treatment by parathyroid transplants and parathyroid tablets had failed to relieve the symptoms.

Mandl's case. Generalised osteitis fibrosa with parathyroid tumour.—A man of 38. History of pains in pelvis and lower extremities for five years. Radiograms showed osteitis fibrosa of femora, pelvis, tibia, and ischium. Treated with parathyroid tablets. Spontaneous fracture of femur; union after two months. Became unable to stand or sit. Noticed heavy white deposit in urine. Four parathyroids from an accident case transplanted into abdominal wall. No improvement. It was therefore decided to explore the neck, though no tumour could be felt. Parathyroid tumour (25 by 15 by 12 mm.) removed at operation. Pains in bones disappeared a few days after operation. White deposit in urine disappeared; urinary Ca excretion dropped to one-eighth the pre-operative value. Three and a half years later no pain. Walks with a stick. Serum Ca 13 to 14 mg. per 100 c.cm. No increase in density of X ray shadows of bones.

HYPER-PARATHYROIDISM.

We now turn to the biochemical aspect of this problem. In 1926 Du Bois[69] investigated the case of a man of 34 with the symptoms and signs of a generalised disease of the skeleton. Radiograms showed extensive decalcification of bones and a large cyst in the right femur. There was hypercalcæmia (serum Ca 15·3 mg. per 100 c.cm.) and a low blood phosphorus (plasma inorganic P 1·4 mg. per 100 c.cm.). Later Aub[70 71] investigated the same case, and found that the urinary output of calcium and phosphorus on a low calcium diet was six to seven times greater than was found in normal individuals under identical conditions. He found that these changes in metabolism were equivalent to those of a normal individual receiving 100 units of parathormone daily. It was, therefore, reasonable to suppose that this patient was suffering from hyper-parathyroidism. Unfortunately, exploration of the neck revealed no tumour. However, it was the study of this case and the use of Aub's methods which led to the discovery of many cases of hyper-parathyroidism in the United States and in this country. Meanwhile in Germany, Austria, and Holland the work of Mandl was producing the same effect. Fourteen cases have now been published,

and I have recorded elsewhere [72] brief abstracts of these.

I will now relate a case [72] which seems to me to place on a firm and irrefutable basis the idea that hyper-parathyroidism is a disease entity, and that the bone changes to which it gives rise are those of generalised osteitis fibrosa.

CASE 4. *Hyper-parathyroidism. Hyperfunction of parathyroid tumour in a case of generalised osteitis fibrosa.*—A married woman of 41 years (L.H. Reg. No. 40173, 1929).

Clinical history—Nov., 1926: Pain in right knee followed by pain in lower part of back and in left buttock, left hip, and back of left thigh. May, 1928: Unable to walk without sticks, pain in lower spine and right knee. Oct., 1928: Attack of right lumbar pain with increased frequency of micturition. No history of having passed calculus or gravel. March 21st, 1929: Operation: Mr. Hugh Lett: Right kidney explored. Pelvis enlarged. No obstruction found. No calculi. Nephropexy performed. July, 1929: Patient walked with difficulty aided by sticks. Sept., 1929: Symptoms worse. Constant pain in lower part of spine and tenderness of forearms and shins on pressure. Nov. 10th, 1929: Patient twisted her left ankle, causing a spontaneous fracture of the neck of the left femur.

Past history: Four children alive and well, one died at four weeks. No miscarriages. In each case labour was normal. No family history suggesting disease of bones.

On examination: Nov. 20th, 1929: A thin, poorly built woman. Calvaria normal size and contour. Sclerotics white. Lenses normal on examination by slit-lamp. Hearing normal. Double dentures. Tongue clean. Mucous membranes normal colour. No thyroid enlargement. No tumour felt in neck. Heart and lungs normal. Blood pressure 140/90. No hypotonicity of muscles. No abnormality in nervous system. Trousseau and Chvostek signs absent. Shortening and eversion of left lower limb. Great pain on any attempt to manipulate left hip. Pressure upon the shafts of the long bones caused pain. On squeezing the hand there was pain in the heads of the metacarpals. In addition there was a smooth, firm, slightly tender swelling 4 by 1·5 cm. in the lower end of the right ulna.

Urine: Cloud of albumin. Deposit: leucocytes.

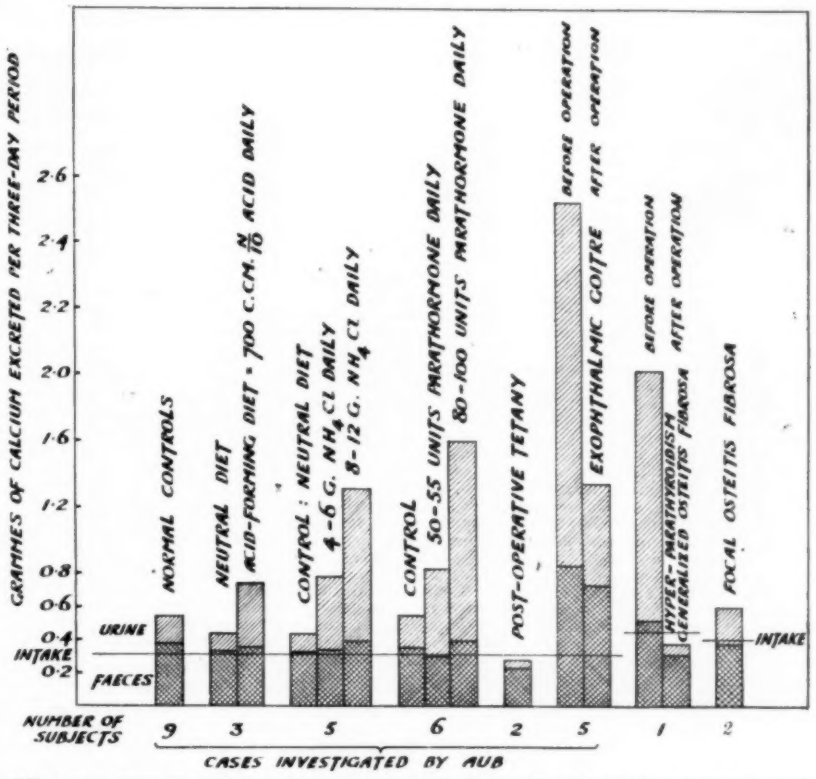
Blood: Bleeding time and coagulation time normal. Wassermann reaction negative.

Radiograms of bones: Greatly diminished density of shadows of all bones examined. This is emphasised by contrast with the bones of a control subject of the same age, sex, and build exposed simultaneously on the same negative. The sacrum, iliac bones, and right ulna (Fig. 5) are especially affected. Pale cyst-like areas, some of them trabeculated, are present in the right ulna, right tibia, right patella, and in many phalanges of the right hand. The left femur is fractured both through the uppermost part of the shaft and through the narrowed neck. The calvaria shows a uniform finely mottled appearance (Dr. S. G. Scott).

Calcium and phosphorus metabolism: There was a constant hypercalcæmia (Fig. 6), the serum calcium reaching as high as 16·7 mg. per 100 c.cm. The corresponding figure for the plasma phosphorus was very low—namely, 1·0 mg. per 100 c.cm. The plasma phosphatase was very high: 1·9 mg. (normal 0·15 mg.). On a known low calcium intake the calcium output in the urine was more than eight times the normal, that in the fæces being approximately normal (Fig. 7).

Operation: Mr. A. J. Walton, Nov. 29th, 1929. A "collar" incision was made in the neck. The left lobe and isthmus of the thyroid were found to be normal. The left inferior parathyroid gland was replaced by a cystic adenoma which was deeply situated in immediate contact with the inferior pole of the left lobe of the thyroid. It was well encapsulated and was removed intact. A portion of bone was removed from the swelling in the lower end of the right ulna.

FIG. 7.



Effects on calcium metabolism of diet, ammonium chloride, parathyroid extract, and disease of the parathyroid and thyroid.

The calcium excretion was estimated on a known low calcium intake. The horizontal lines represent the calcium intake, which was approximately 100 mg. daily. The urinary calcium excretion is represented by single cross hatching and the fæcal calcium excretion by double cross hatching.

Report on specimens removed at operation (S.D. 2806, 1929): Prof. H. M. Turnbull. (1) *Left inferior parathyroid body. Macroscopic.*—The specimen was pyriform, tense, and fluctuating, and measured 3·7 by 3 cm. (Fig. 8). On section a slightly opaque, blood-stained fluid escaped, and the specimen collapsed. The wall consisted of a thin membrane to the greater part of which was attached a lining of opaque, pale ochreous tissue. This was 0·8 cm. at its thickest, contained cystic cavities and was broken on its mesial aspect into ragged trabeculæ.

Microscopic.—The gland is surrounded by a thin capsule of dense collagenous fibrous tissue, and contains numerous large and a few small cysts. These have smooth margins without any reticular or other lining, and are filled with an albuminoid coagulum and occasionally red corpuscles. Between the cysts a mass of mutually compressed cells is traversed by numerous capillaries and a few arteries and veins. Small alveolar spaces are very rare. The cells and their nuclei resemble those of a normal gland. They vary in size, but the mean size is decidedly larger than normally. The cytoplasm is finely granular or vesicular, occasionally coarsely vesicular; a linear cell-membrane usually separates adjacent cells. Groups of cells, particularly near the margins of cysts, are loaded with anisotropic lipoid. Glycogen is present in many cells, but is usually scanty and confined to

the periphery. There is no collagen, fibroglia, or reticulum apart from the walls of capillaries and the adventitia of larger vessels.

Remarks.—The appearances indicate a functional hyperactivity rather than an autonomous neoplasm.

(2) *Expanded lower end of right ulna. Macroscopic.*—Slice (1·5 by 1·3 by 0·5 cm.), including both periosteal surfaces. The sawn surfaces were pink and gritty. A hand lens showed closely packed projecting grey spicules in a pink ground. There was no trace of ivory bone.

Microscopic (Fig. 9).—The bone was partially decalcified in Müller's solution. Sections were stained by Kossa's and other methods. Beneath the periosteum on both sides of the bone, passing through the corticalis, completely replacing it in places, and extending throughout the medulla is a cellular collagenous fibrous tissue. The collagen fibres are stained deep red by van Gieson's stain. Spindle fibrocytes are numerous throughout. In the medulla it contains a few small groups of "foam cells." There are many vessels. Most are small, and none is exceptionally wide. Most are sharply defined capillaries, but there are a few veins and arterioles. There are one or two small perivascular hæmorrhages.

The corticalis is for the most part very thin or broken into small isolated trabeculæ. The thickest portion is fretted by numerous deep bays of subperiosteal fibrous tissue. It is composed of both coarsely fibred and finely fibrillated (lamellar) bone. The coarsely fibred bone usually forms a core to the lamellar bone; this arrangement is particularly clear in the thickest portion of corticalis. Active apposition is shown by osteoid zones covered by a layer of osteoblasts, and is found upon the greater part of the surface, particularly the outer surface on one side of the bone and the inner surface on the other. The osteoid tissue is almost entirely lamellar. The margins of the calcified bone show numerous Howship's lacunæ, even beneath the osteoid zones. On the inner surface of the corticalis upon one side are numerous large osteoclasts; a few lie upon osteoid tissue, the others occupy lacunæ in bone.

The medulla is beset with small trabeculæ of very irregular, deeply notched outline. They are composed of both coarsely fibred and lamellar bone. Coarsely fibred bone predominates, but the bone in process of apposition is almost entirely lamellar. This active apposition is shown by osteoid zones covered by a layer of osteoblasts. Portions of the surface free from active apposition are relatively very rare. They almost always show large osteoclasts in lacunæ. Occasionally groups of several large osteoclasts enclose one or two spicules of bone. Other osteoclasts in the fibrous tissue are not connected with any bone in the section. Most of the osteoclasts are exceptionally large.

The depth of the osteoid zones upon the corticalis and upon the trabeculæ in the medulla is obviously very frequently exaggerated by tangential section; tangential section must occur very frequently when the calcified trabeculæ are of such very irregular shape. The shape of the osteoblasts varies with the obliquity of the section. Where the zones are cut at right angles to their surface, the osteoblasts are narrow spindles. Drawings were made of many osteoid zones cut strictly at right angles, and were compared with drawings of osteoid zones in the ribs of infants at and shortly after birth, and in callus in the bones of adults from 13 to 22 days after fracture. The osteoid zones in the present case are slightly deeper than the deepest zones in the normal infants, but are no deeper than the zones in the healing fractures.

Remarks.—The fibrous tissue beneath the periosteum and throughout the bone has the uniform and highly differentiated structure of an osteitis fibrosa as opposed to sarcoma. Coarsely fibred bone is not found in the medulla of a normal ulna at any age, and coarsely fibred bone of the kind present in this specimen is not found in the corticalis of an adult. The coarsely fibred bone is abnormal and has been formed during the disease. It is clear, therefore, that the pathological process has caused the resorption of at least a large part of the original corticalis, and almost all the original spongiosa. At the same time, or subsequently, new, coarsely fibred bone has been deposited, and lamellar bone has been laid upon this. At the time of excision of the specimen, both apposition and resorption were in active progress. The fluctuation in these two processes is shown by the presence of osteoid zones upon Howship's lacunæ, and by the occasional presence of an osteoclast upon osteoid zones which everywhere else are covered by osteoblasts. At the time of excision active apposition predominated over active resorption; and, although past resorption is the most striking feature in the corticalis, it is masked in the medulla by the great number of newly formed trabeculæ. The abundance, however, of newly formed bone in this focal swelling of the ulna cannot be taken as characteristic of the changes throughout the skeleton, in view of what was found in Case 3. In Case 3 an even greater formation of new bone was found in focal areas, but in the skeleton as a whole resorption far exceeded apposition.

The bone which had been formed in the excised portion of ulna during the disease is fully calcified, except in the sharply defined osteoid zones. These zones are conspicuously deep, but the measurements described above show that they are not deeper than the osteoid zones formed in the active healing of fractures in healthy adults. There is no histological evidence, therefore, of the cessation of calcification characteristic of osteomalacia and rickets nor of a removal of calcium by chemical solution. The mobilisation of calcium was due to lacunar resorption by osteoclasts. (H.M.T.)

Progress up to three months after operation.—Twenty-four hours after operation Chvostek sign appeared and has persisted since. On the second day pressure upon the bones caused much less pain than previously. The blood chemistry 48 hours after removal of the tumour showed that the serum calcium had dropped to a level below normal—namely, 9·1 mg. per 100 c.cm. (Fig. 6). Simultaneously the plasma inorganic phosphorus rose to 2·8 mg. per 100 c.cm. By the fourth day pressure upon the bones no longer caused pain. The patient has been kept in bed with the left leg fixed in abduction. In controlled radiograms the density of the bone shadows is the same as before operation.

Calcium and phosphorus metabolism.—Latent tetany has persisted in the shape of Chvostek sign, but there has been no manifest tetany, and Trousseau sign has never been present. The calcium and phosphorus levels in the blood are still slightly below normal. The plasma phosphatase is 1·14 mg. The calcium output (Fig. 7), estimated for four three-day periods on the same low calcium diet as before operation, is less than in the normal individual. It corresponds to that of a case of post-operative tetany.

In this case we may say that clinical, radiological, chemical, and histological evidence combine to show that the patient was, by urinary excretion, rapidly losing calcium salts from the skeleton in amounts exceeding eight times the normal.

This gave rise to the complete picture of a disease known to von Recklinghausen 40 years ago, in days when it was impossible to solve the problem of its ætiology. His insistence that the disease was not osteomalacia is borne out by all the additional facts brought to light by our new methods. Unfortunately, the literature of the subject shows only too plainly that his work has been largely overlooked, for we find hyper-parathyroidism being confused with osteomalacia in 1929.

Clinical Characteristics of Hyper-parathyroidism.

Of the 14 cases published to date, in nine a parathyroid tumour was removed, in two one or more histologically normal parathyroid bodies were removed,[70 73] and in three there was no operation on the neck.[74 75] The condition is reported twice as frequently in women as in men, the commonest ages being 30 and 55. The histological picture of osteitis fibrosa was established in seven cases, and in two of these giant-celled tumours are mentioned. Pain in the bones and spontaneous fractures were common. Polyuria occurred in three cases, and in one of these bilateral renal calculi were found.[76] Hypotonicity of muscles is described in two cases. In nine cases there was no palpable swelling in the neck, but on exploration only two of these failed to show a parathyroid tumour. In these two cases it may be that a tumour was present and was not found. In those cases where radiograms are mentioned there was greatly diminished density of the bone shadows. Sometimes there was radiological evidence of cysts, but these only rarely expanded the corticalis. The serum calcium figures varied between 13·1 and 23·6 mg. per 100 c.cm., the plasma phosphorus between 1·0 and

2·7 mg. The output of calcium in the urine varied from a slight increase to eight times the normal figure.

The tumours removed were usually encapsulated adenomata, often cystic, and measuring about 2·5 cm. in diameter. The largest tumour removed was 5 by 3·5 by 3 cm. and has been described as a malignant adenoma.[77 78] In the majority of cases pain in the bones was abolished immediately after operation, and the mechanism of this is difficult to conceive. In one case[79] removal of the tumour promptly abolished polydipsia and polyuria. In many cases the levels of the blood calcium and phosphorus and the excretion of calcium in the urine were restored to normal. Sometimes there was temporary hypocalcæmia and even oliguria, with subnormal excretion of calcium in the urine.[80] Latent tetany after operation was common, and manifest tetany often occurred, with marked variations in severity. It was fatal in one case only—namely, that of Beck,[81] where two parathyroid tumours were removed. This is the only case of hyper-parathyroidism recorded in which more than one tumour was found. In Snapper's case[82] tremor and acute mania occurred three weeks after operation, at a time when the serum calcium had dropped to 6·6 mg. per 100 c.cm. The condition was completely relieved in three days by the use of parathormone injections in conjunction with a preparation of calcium given intravenously.

With regard to the later effects of operation it is too early to make a statement. There is no doubt that symptomatic improvement occurs after extirpation of a tumour; eight of the nine patients surviving operation all showed this, and it was possible for some of them to dispense with sticks and crutches. In the two cases where normal parathyroid glands were removed, the hypercalcæmia persisted and little improvement occurred. Considering the generalised and extensive destruction of bone, one would expect complete repair to take many months or years. It is a very different question from osteomalacia or rickets, where osteoid tissue merely awaits conversion into bone by a process of calcium deposition. Some authors claim that an increase in density in the radiographic shadows of bones was to be seen in their cases a few months after operation. It is of great interest that three years after operation no such change could be demonstrated in Mandl's case.

Pathogenesis of Generalised Osteitis Fibrosa (Hyper-parathyroidism).

In view of all these cases there can be little doubt that the essential change in generalised osteitis fibrosa is a removal of calcium from the skeleton owing to parathyroid hyperactivity, the condition being similar to the experimental administration of parathormone to animals. In referring to the skeletal changes the term osteomalacia is frequently used, but there is no histological evidence of true osteomalacia. The calcium is removed by lacunar resorption by osteoclasts. The resorption is widespread, but it is accompanied by focal formation of new bone. In the formation of new bone the osteoid zones are frequently deeper than in the normal bones of adults, but as was shown by Schmorl[83] and independently by Turnbull in the two cases described here for the first time, the unusual depth is merely evidence of rapidity of formation, the greatest depths being no greater than in the healing of fractures in healthy adults.

Focal Osteitis Fibrosa.

Of much more common occurrence than the generalised disease is focal osteitis fibrosa. This is a condition affecting one or more bones, usually not disabling, of slow progress, and showing a tendency to become arrested. It occurs chiefly in adolescence and is often symptomless until spontaneous fracture occurs.

In those cases which I have investigated, the serum calcium and plasma phosphorus and phosphatase have been normal. (Table I).

Table I.

Sex.	Age.	Foci.	Diagnosis.	Ca.	P.	Phosphatase.
F.	18	Multiple.	Radiological.	9·9	3·5	0·248
F.	17	Single.	Histological.	10·5	2·3	0·217
M.	19	,,	,,	9·7	3·5	0·201
M.	24	,,	,,	9·7	3·5	0·219
M.	19	Single (cyst).	Radiological.	9·9	3·8	0·162
F.	30	Single.	Histological.	8·8	3·0	0·179
M.	16	Single (cyst).	,,	9·4	4·3	0·235

I shall now relate a case in which the calcium balance was normal, a finding in striking contrast to that of the generalised disease.

Case 6. *Osteitis fibrosa in multiple foci.*—A married woman of 27 years (L. H. Reg. No. 40007, 1930).

Clinical history.—Twelve months: enlargement of right arm above elbow. Three weeks: aching pain in arm began in fourth month of pregnancy. No fracture nor history of fracture. Two children well.

Calvaria normal. Sclerotics white. Slit-lamp examination showed within the fœtal nucleus of each lens crowds of tiny white glistening dots surrounded by a small area of cloudy lens. No visual defect. No tumour felt in neck. Diffuse irregular enlargement of right humerus with outward bowing in upper part. No deformity of other bones. Wassermann reaction negative. Radiograms of bones: right humerus and radius show pale trabeculated areas with expansion of bone. Similar, less definite areas round acetabulum and in left ischium. Controlled radiograms showed that outside these areas the shadows of all bones were of normal density. The blood chemistry was found repeatedly to be normal (serum Ca 9·8 mg. per 100 c.cm., plasma phosphorus 3·0 mg., plasma phosphatase 0·363 mg.). On a known low calcium intake the calcium output in urine and fæces was normal (Fig. 7).

This is not an isolated instance of a normal calcium balance in focal osteitis fibrosa; I found it also in the first case shown in Table I.

Taken in conjunction with the above observations on the blood of seven other cases, the finding of a normal calcium metabolism is of far-reaching importance. Supported as it is by the normal density of the radiographic shadows of bones, it is evidence strongly against hyper-parathyroidism. It is of vital importance in such cases to realise that, although many bones are affected, the condition is totally different from the generalised disease and that exploration of the neck is clearly unjustifiable.

I shall now go on to discuss the effects of the thyroid hormone and of thyroid disease on the metabolism of calcium and phosphorus.

Effects on Calcium Metabolism of Thyroxin and Thyroid Disease.

It is, of course, known that the internal secretion of the thyroid gland raises the basal rate of combustion of carbohydrate, fat and possibly protein, consequently appreciably increasing the total heat production of the organism. Its effect, however, on inorganic salt metabolism had until about two years ago largely been ignored. Parhon,[84] in 1912, showed a marked loss of calcium in rabbits fed with lethal doses of thyroid, and her work definitely suggests a stimulating effect of the thyroid on calcium metabolism. Kummer,[85] in 1917, studied for 13 days the metabolism of a man aged 42 suffering from exophthalmic goitre. Two and a half litres of milk were given daily, which meant that the calcium intake was approximately 5 g. per day. No determinations were made of the basal metabolic rate, and control figures for calcium were taken from the literature. Because the quantity of calcium in the urine was normal, and that in the fæces was large, he attributed the high fæcal calcium to a difficulty in absorption rather than to abnormal excretion. He concluded that the mineral excretion was high but very irregular, both the calcium and phosphorus losses being especially great.

It is to Aub, Bauer, Heath, and Ropes,[88] however, that we owe an accurate knowledge of the part played by the thyroid in calcium metabolism. Working with low calcium diets they have found that hyperthyroidism is associated with a markedly increased calcium excretion, and that the mechanism by which this is brought about differs widely from that of the parathyroid. They made observations on 16 cases of thyroid disease, and on two normal individuals given thyroid, and in all these cases they found consistent results. In eight cases of exophthalmic goitre the elimination of calcium was 231 per cent. above the average excretion per kilo found in control cases. In one severe case of exophthalmic goitre the calcium excretion was eight times the normal. These increases were out of all proportion to the effect on the basal metabolic rate, the average increase of which was only 55 per cent. above normal. During treatment with iodine, and after subtotal thyroidectomy, as the patient improved and the basal metabolic rate approached the normal, the calcium excretion also returned towards normal.

Additional evidence was furnished by two cases of so-called hyper-functioning adenoma of the thyroid. The calcium excretion was raised to almost twice the normal and fell definitely after the adenomata were removed. The effect of the administration of thyroid was studied in two normal individuals. In one of these gr. 42 of thyroid extract were given by mouth over a period of four days, and on the fourth day 10 mg. thyroxin were given intravenously. Ten days later apprehension, fever, malaise, and tachycardia appeared. At this point the basal metabolic rate had risen to plus 48 per cent., and the calcium excretion was doubled.

These studies clearly show that the thyroid hormone stimulates calcium excretion to an extent far in excess of that produced by acids or even by parathormone.

But if thyroxin increases calcium excretion, then myxœdema may be expected to be associated with a diminished calcium output. This was clearly established by these authors in six cases, where they found the average excretion to be 40 per cent. below the normal. Administration of thyroid to these patients with myxœdema resulted in an increase both in metabolism and in calcium excretion.

Thyroid Treatment of Parathyroid Tetany.

Striking effects were obtained by the use of thyroid preparations in a case of post-operative tetany.[38] Sufficient thyroid extract by mouth and thyroxin intravenously were given to raise the basal metabolic rate from minus 14 to plus 22 per cent. This occurred over a period of two weeks, during which time the blood calcium rose from 6·7 to 11·9 mg. per 100 c.cm. The calcium excretion increased to three-fold its previous value. This increase of calcium in the blood and excreta was still present six weeks after the last dose of thyroid extract, a surprising result which was confirmed later in the same patient. This effect on calcium is not an indirect result of the raised metabolic rate, for the increased calcium excretion reached its height only when the basal metabolism was falling, and this increase was maintained long after the effect on the basal metabolism had subsided. This calcium stimulation, therefore, had a longer latent period and more prolonged effect than any other function of the thyroid yet described.

The effect of thyroid on the blood in this case is quite astonishing, when we recall that the serum calcium values in thyroid disease are normal. In exophthalmic goitre, even though calcium excretion may be eight times the normal, this high rate of elimination is not obvious in the blood, for there is no hypercalcæmia. And yet thyroid treatment has been found to raise the serum calcium in parathyroid tetany!

Action of Thyroid and Parathyroid Contrasted.

As to further contrasts between the thyroid and parathyroid mechanism we notice from Aub's figures[88] in Fig. 7 that, of all the conditions he studied, it was in hyperthyroidism alone that he found a distinct increase in fæcal as well as in urinary calcium excretion. It was also obvious that the fæcal calcium was not unabsorbed calcium, for there was more present in the fæces than was present in the food. Why the fæcal excretion should be increased above this basal level only by the thyroid is very difficult to understand, particularly as the blood calcium in thyroid disease is normal.

In hyperthyroidism a marked increase in phosphorus excretion was also found.[86] This increase was quantitatively such as to suggest that most of the calcium excreted came from tertiary calcium phosphate in bone.

Is the high calcium excretion of hyperthyroidism dependent on the increased thyroid secretion, or is it merely an accompaniment of an increased metabolism? This question was answered[86] by determining the calcium excretion in cases with a high metabolism due to prolonged fever and leukæmia. Three out of four such cases showed a normal calcium excretion in spite of an elevation of general metabolism, varying from plus 21 to plus 41 per cent. We may therefore conclude that an increased calcium excretion is not necessarily a function of a raised metabolic rate alone.

Does thyroxin exert a stimulating effect on the parathyroid glands? The normal blood calcium in hyperthyroidism and after intravenous thyroxin argues against this. But very little is known about the threshold of calcium excretion, and we have pointed out elsewhere [22] that the administration of parathormone may sometimes cause a great increase of calcium excretion without appreciably raising the serum calcium level.

We recently attempted [25] to solve this problem by animal experiments in which the action of thyroxin was investigated after total thyro-parathyroidectomy. In other words, we wanted to know whether thyroxin would increase the calcium output in animals deprived of their parathyroids. We worked with dogs and cats kept in metabolism cages on a low calcium diet. After operation they were allowed to go into tetany, and

GENERALISED OSTEITIS FIBROSA: HYPER-PARATHYROIDISM.

Descriptions of Illustrations on Coloured Plate.

FIG. 4. (Case 3).—Bones (¼-scale) in a case of generalised osteitis fibrosa with parathyroid adenoma.

(A) *Left femur.*—Note fractures through cysts in centre of shaft, area of red-brown tissue in inner condyle, and coarse grey trabeculæ of bone bordered by fibrous tissue in spongiosa of neck.

(B) *Sixth right rib.*—Note nodule of red tissue containing small cysts and expanding bone.

(C) *Third right rib.*—Note tumour expanding bone.

FIG. 5. (Case 4).—Controlled radiogram of right forearm in a case of hyper-parathyroidism. The density of the X ray shadows of the bones is contrasted with that of a control subject of the same age, sex and build exposed simultaneously on the same negative. Note the diminished density of the bone shadows and the pale cyst-like areas, some of them trabeculated. The control is marked E.

FIG. 8.—Tumour (actual size) of left inferior parathyroid body removed at operation in Case 4. In the cut section note the relatively large amount of solid tissue. This is functionally hyperactive parathyroid tissue.

FIG. 9.—Histological section of portion of expanded lower end of right ulna removed at operation in Case 4. (Müller's solution; Weigert's iron hæmatoxylin and van Gieson's mixture.) There is fibrous tissue beneath the periosteum and throughout the bone. A large part of the original corticalis has been removed by osteoclastic lacunar resorption. The bone formed during the disease is fully calcified except in the osteoid zones. These are not deeper than those formed in the active healing of fractures in healthy adults.

GENERALISED OSTEITIS FIBROSA: HYPER-PARATHYROIDISM.

FIG. 4.

FIG. 5.

FIG. 8.

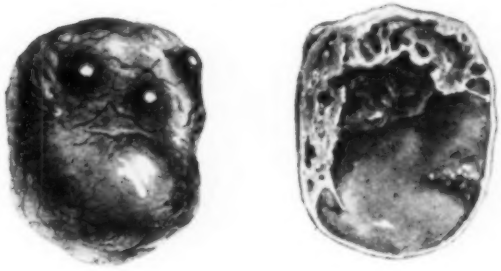
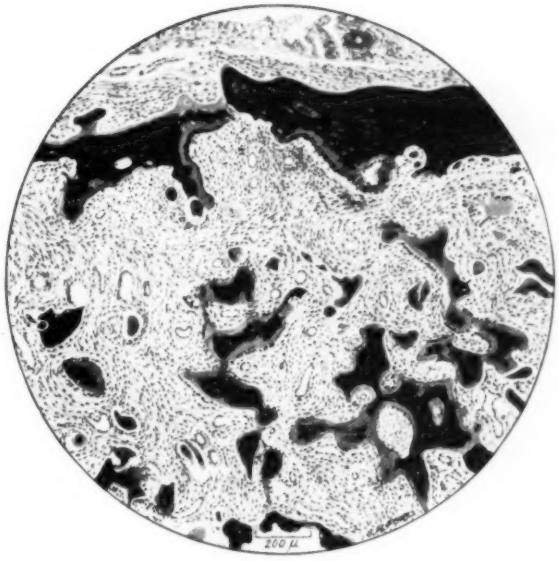


FIG. 9.



STUDIES IN CALCIUM AND PHOSPHORUS METABOLISM

(DR. DONALD HUNTER).

OSTEOPOROSIS IN EXOPHTHALMIC GOITRE.

FIG. 11.

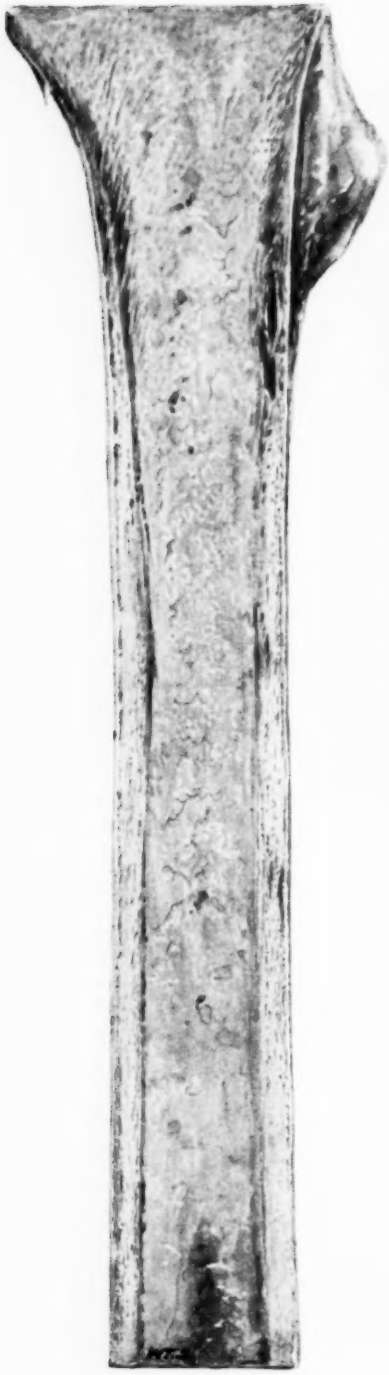


FIG. 12.

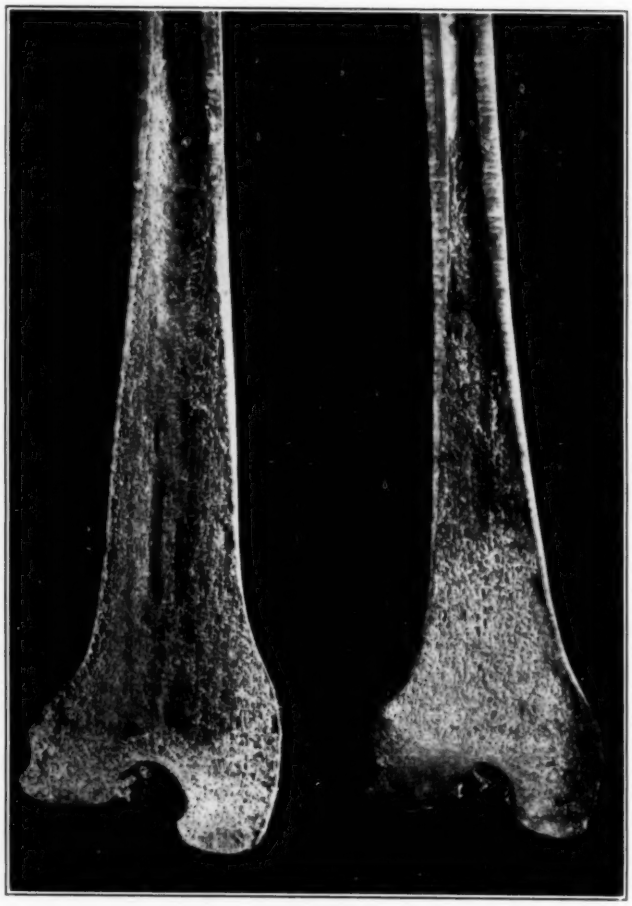


FIG. 13.

STUDIES IN CALCIUM AND PHOSPHORUS METABOLISM

(DR. DONALD HUNTER).

then the smallest dose of parathormone required to keep each animal just free from tetany was determined. Subsequently large doses of thyroxin were injected every second day, and the dose of parathormone was kept constant. In the case of the cats the experiment was a complete failure; thyroxin made them ill and they died in tetany. The dogs were more satisfactory, but a gradual drop in the serum calcium with the appearance of tetany ten days after the last dose of thyroxin made us decide that the conditions of the experiment were too exacting upon the available stores of calcium. We intend to repeat the experiment with intervals of high calcium therapy, during which, of course, we shall lose our observations on calcium balance.

The alternative explanation—namely, that the thyroid exerts a direct effect on bone katabolism—is not an unlikely one, especially as this would be in agreement with the general action of thyroid on other body tissues.

Radiographic Studies of Bones in Exophthalmic Goitre.

The studies of Kummer [85] on the metabolism in exophthalmic goitre led him to the conclusion that the calcium excretion was high in this disease. He was apparently the first to make the exceedingly interesting observation that "as judged from radiograms this calcareous demineralisation affects the bony system." In 1927 Bernhard,[87] investigating a case of exophthalmic goitre in a woman of 47, described radiograms showing poverty of calcium in the bones.

Aub and his co-workers[86] observed independently the same phenomenon. They took controlled radiograms of the hands of a patient with exophthalmic goitre of 17 years' duration and demonstrated marked poverty of calcium in the bones.

In their paper they point out that the change is unlikely to be a constant finding in hyperthyroidism, since adequate calcification of the bones should be possible in cases where the diet contains sufficient calcium.

Plummer and Dunlap [83] found radiographic evidence of severe osteoporosis in three cases of hyperthyroidism, in two of which carcinomatosis of the bones had been suspected. An autopsy on one of these cases revealed generalised osteoporosis, especially of the calvaria and ribs, the latter showing multiple fractures. No histology is recorded. These authors state their belief that the process of decalcification of bone in hyperthyroidism is usual.

In our experience controlled radiograms of the bones in exophthalmic goitre reveal poverty of calcium in less than half the cases examined (Fig. 10). In two cases of hyperthyroidism with spontaneous fracture we have found radiographic evidence of decalcification not only of the fractured bone but also of all other bones examined.

Chemistry of the Blood in Exophthalmic Goitre.

The demineralisation of bone seen in radiograms is, in fact, a widespread osteoporosis brought about by osteoclastic lacunar resorption. Before demonstrating this it will be of interest to inquire into the values found for the plasma phosphatase in cases of exophthalmic goitre. It has already been emphasised that the serum calcium and plasma inorganic phosphorus are consistently normal in hyperthyroidism. The phosphatase values in the plasma are often high, though the increase is neither so great nor so consistently present as in the case of osteitis deformans. There seems to be no relation between the duration of the disease, the degree of osteoporosis, and the values for the plasma phosphatase (Table II.).

TABLE II.

Sex.	Age.	Duration in years.	Osteoporosis in radiograms.	Ca.	P.	Phosphatase.
F.	66	18	Severe.	9·0	3·3	0·260
F.	21	3	Slight.	9·2	4·0	0·430
F.	30	3	Considerable.	8·8	3·8	0·446
M.	25	1	Slight.	9·7	4·3	0·448
F.	50	15	Slight.	9·7	3·8	0·221
F.	48	2	Absent.	9·8	3·3	0·525
F.	24	3	Slight.	9·9	3·0	0·380
F.	40	4	Absent.	9·1	3·3	0·189

OSTEOPOROSIS IN EXOPHTHALMIC GOITRE.

In view of the chemical and radiographic studies just described it became a matter of importance to examine the bones in exophthalmic goitre. Cases 6 and 7 serve to show that severe generalised osteoporosis may be found in hyperthyroidism of many years' duration.

A search of the literature revealed the fact that this condition was known to von Recklinghausen and Askanazy, though they had no means of determining the true relation between the thyroid disease and the osteoporosis.

Case 12 of von Recklinghausen.[82] (See also Koeppen.[88]) *Juvenile osteomalacia with Basedow's disease.*—A single woman of 23, dressmaker in Strassburg. There had been no puerperium. Five years' history of goitre, prominence of eyes, and palpitation. Two years before: pain in back brought to her notice that her spine was twisted. Later, pain in both arms, sometimes cramps in hands and feet. On examination: exophthalmos, tremor, tachycardia, enlarged heart. Slight kypho-scoliosis. Trousseau sign absent.

Necropsy: great enlargement of thyroid and thymus. Hypertrophy of heart. Several of the bones are marked by uncommon redness for that age, especially the cortices of the long bones, which are everywhere marked longitudinally with vascular striæ. In the calvaria, scapula, and iliac bone there are definite vascular striæ. All the bones saw like rotten wood, the sternum and calvaria being readily cut with a knife. Maceration revealed numerous small exostoses corresponding to the insertions of tendons. Histologically, resorption spaces were abundant in the corticalis, and they often contained whole nests of osteoclasts.

A comment is made that the degree of osteoclastic resorption was equalled only by that found in Case 7 (generalised osteitis fibrosa). Both authors describing this case believed that the bone changes were secondary to the exophthalmic goitre, but they expressed a doubt as to whether this form of "osteomalacia" was identical with the ordinary puerperal form.

Askanazy's case with thyroid tumour.[90] *Calcium metastases and progressive atrophy of bone.*—A woman, aged 54. History of goitre for five years, no pressure symptoms. Thirteen months before, she had been in bed with sacral backache following a fall. Three weeks before: renal colic, passed two calculi. Died of suppurative pyelonephritis.

OSTEOPOROSIS IN EXOPHTHALMIC GOITRE.

Descriptions of Illustrations on Coloured Plate.

FIG. 11. (Case 6).—Right femur (actual size) in a case of exophthalmic goitre. The perfectly homogeneous ivory-like corticalis which is seen in the normal bone is here interrupted by many pink longitudinal narrow streaks and rows of dots.

FIG. 12.—On the left is seen a macerated specimen of the left femur in Case 6. It has been sawn longitudinally and digested in pancreatic solution. Note the pitting of the corticalis and the conversion of the spongiosa into an exquisitely delicate lace of fine bony threads. On the right is a control specimen of the left femur from a healthy subject of the same age and sex, prepared in the same way.

FIG. 13.—Histological section of corticalis of centre of right femur in Case 6. (Müller's solution; Delafield's hæmatoxylin and eosin.) Subperiosteal area. Note general osteoporosis, lacunar resorption by osteoclasts, an osteoid zone, and perforating canals.

At necropsy: large retrosternal goitre which had become carcinomatous and had given rise to metastases in the lungs. Multiple calcified areas in lungs, one in gastric mucosa. Purulent pyelitis with renal calculi; perinephric abscess.

"On palpation of the ribs at their angles a few small exostoses were felt. The spongiosa of the ribs was wide-meshed. In the spongiosa of the vertebræ also there were spaces up to the size of lentils. The bony spicules could be pressed in more easily than usual. In the macerated vertebræ the spicules, both in the bodies and in the laminæ, were like bony threads."

Sections were made from spine and sternum. The histological picture revealed resorption of bone of greater

FIG. 10.

Controlled radiogram of hand showing osteoporosis in exophthalmic goitre. (From the first case in Table II.)

The density of the X ray shadows of the bones is contrasted with that of a control subject of the same age, sex and build exposed simultaneously on the same negative. The diminution in density of the bone shadows is uniform. There are no pale cyst-like areas.

severity and extent than could have been predicted from the macroscopic appearance of the bones. "The picture in every section examined was striking and beautiful. One has rarely observed in so dramatic and extensive a way the pure uncomplicated process of progressive bone resorption by osteoclasts. Innumerable typical osteoclasts lay in lacunæ in the bone, and lacunar resorption was universal. In many fields I could count 40 to 80 osteoclasts lying in an uninterrupted row." Occasionally apposition of new bone in narrow layers was observed, but by no method of fixation or staining could osteoid tissue be demonstrated.

CASE 6. *Osteoporosis in exophthalmic goitre.*—A girl of 19 years (L. H. Reg. No. 23935, 1928).

Clinical history.—Patient was a factory hand. For five years she had noticed breathlessness, palpitation, loss of weight, and prominence of the eyes. For 10 months there had been gradual enlargement of the neck, and she became unable to work. Weight, 106 lb. 5 oz. Height 5 ft. 7½ in. Fine tremor, exophthalmos, and great enlargement of the thyroid. Pulse 120, regular. Heart hypertrophied, with a thrusting apical impulse displaced 1 in. to the left. Treatment with iodine reduced the pulse-rate to 100. At operation the isthmus and right lobe of the thyroid were removed. Death occurred 21 hours later.

Summary of necropsy (P.M. 469/1928). Prof. H. M. Turnbull. *Broncho-pneumonia. Operation: removal of isthmus and right lobe of thyroid. Graves's disease.* Cellular hyperplasia and focal lymphocytic infiltration of thyroid gland. Hypertrophy of thymus (47·5 g.). Moderate exophthalmos. Exceptionally abundant lymph-adenoid tissue throughout body. Hypertrophy of myocardium. Focal areas of necrosis and fibrosis in right papillary muscle of mitralis. Large area of organised pericarditis upon right ventricle. Fatty degeneration, microscopic central focal necroses, and considerable portal fibrosis of liver. Slight fatty degeneration of kidneys. Osteoporosis.

Bones. A. Macroscopic examination.—The right femur, right humerus, left radius, and left ulna were sawn in longitudinal section. In no bone was the corticalis appreciably thinner than normally; that of the femur was 0·7 cm. thick. But the perfectly homogeneous ivory-like cut surface which is seen in the normal bone was interrupted by many pink longitudinal narrow streaks and rows of dots. These were especially numerous in the femur (Fig. 11).

B. Macerated specimen (Fig. 12).—The left femur, sawn longitudinally and macerated, was compared with a similarly prepared left femur from a healthy subject of the same age and sex. The femur measures 46·5 cm., is 6·1 cm. longer than this control and is greater in every external measurement; otherwise there is no difference in gross and fine structure externally. In spite of its greater size it is astonishingly light in comparison with the control (dry weight 206 g., control 291 g.). Internally the corticalis is thicker than in the control at the junction of the neck with the internal surface of the shaft. It is considerably thinner in the middle third of the shaft, and much thinner in the lower third. The thick area in the neck is so pitted as to be almost spongy in texture. In the upper two thirds there is a row of pits forming a vertical groove close beneath the surface, and internal to this are many scattered pits. In the lower third alone does the corticalis show the ivory-like surface of the control. The medullary cavity is greatly enlarged, 12 cm. of the upper half of the shaft being entirely free from trabeculæ in comparison with 3 cm. just above the centre in the control. The architecture of the spongiosa is not altered, but the trabeculæ are much more slender throughout and, except in the anatomical neck and condyles, form an exquisitely delicate lace.

C. Microscopic examination.—A longitudinal slice of the corticalis from the centre of the femur was fixed in 4 per cent. saline formaldehyde and transferrred to Müller's solution. It was later split; one half was treated with Müller's solution alone, in the other half decalcification was hastened by a drop of nitric acid. Both pieces were cut, and sections were stained by Kossa's and other methods.

The corticalis of a large long bone in a normal subject of ten years or over consists of a compact mosaic of lamellar systems traversed by vessels. Most of these vessels run in the long axis of the bone in Haversian canals surrounded by Haversian lamellar systems. Uniting these are a few transverse or oblique vessels, either in Haversian canals or in perforating canals. Haversian spaces are very rarely met.

In the present case the corticalis consists of a substantia reticularis (Fig. 13), instead of a substantia compacta. A net of trabeculæ of lamellar systems encloses medullary spaces, of which the longitudinal axis is the greatest. The general arrangement of the spaces corresponds to that of the vessels in a normal bone. Almost all the Haversian canals and systems have disappeared; there are several perforating canals (Fig. 13). The trabecula immediately beneath the periosteum is narrow, and it shows several large and small subperiosteal bays filled with a vascularised, delicate fibrous tissue. The largest medullary space lies immediately beneath this and traverses the whole 1·8 cm. of the section. The medullary spaces contain hæmatogenous marrow. The boundaries of many of the spaces show very numerous Howship's lacunæ, many of which are occupied by osteoclasts (Fig. 13). Very few of the trabeculæ show an osteoid zone (Fig. 13); the depth of such zones is within the limits measured in the ribs of newly born infants. The trabeculæ are otherwise fully calcified.

Remarks.—The compact tissue of the corticalis has been greatly rarefied by osteoclastic lacunar resorption; there is no histological evidence of a cessation of calcification such as is found in rickets and osteomalacia nor of a removal of calcium by chemical solution. The macerated specimen shows that this resorption is not confined to the corticalis, but is apparently greater throughout the spongiosa and medullary cavity. (H. M. T.)

This is not an isolated instance of osteoporosis occurring in exophthalmic goitre; we have observed it in other cases, of which the following is an example.

CASE 7.—*Osteoporosis in exophthalmic goitre.*—A single woman of 28 years (L. H. Reg. No. 24678, 1929). History of five years' swelling of neck, nervousness, loss of weight, palpitation. Weight 75 lb. 19 oz. Height 5 ft. 3 in. Enlarged thyroid, marked exophthalmos, fine tremor. Pulse 120, regular, fell to 80 on treatment with iodine. Died five hours after partial thyroidectomy.

Osteoporosis is so severe that the spongy bone in the lower end of the femur exists only in patches. The trabeculæ composing this spongiosa are fine bony threads readily crushed on slight pressure. The corticalis is only slightly affected. The femur is 44·4 cm. long and, after maceration, its dry weight is 226 g. The femur of a healthy woman, aged 22 years, was similarly prepared. Its weight is 378 g. and its length 46·0 cm.

Neither atrophy from disuse nor senile osteoporosis can enter into these observations, for these patients had been up and about until a few weeks before death, and were essentially youthful.

Hyperthyroidism differs from hyper-parathyroidism in that there is no increase of calcium in the blood. But calcium is removed from the skeleton in both, and in both the mechanism of removal is a lacunar resorption by osteoclasts.

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BRITISH HUMANE ASSOCIATION.—Last year this association gave free light and electrical treatment to 128,000 persons. A supplementary clinic is to be opened for the benefit of those who can pay the ordinary fee. The institution, which controls the London Light and Electric Clinic, was founded and endowed by the late Mr. Campbell-Johnston, but the death duties have made such serious inroads upon the endowment fund that the development schemes prepared by the founder must remain in abeyance unless more money is forthcoming. At the annual meeting of the Association held recently Lord Scarbrough, Sub-Prior of the Order of St. John of Jerusalem, explained that upon the founder's death last year its control passed to the Order.

END-RESULTS OF MANIPULATION OF THE BACK.

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A CONSIDERABLE number of the patients who attend a general hospital complaining of pain in the back are sent to the orthopædic department, often after previous investigation by a urologist or gynæcologist. In the Orthopædic Department at Middlesex Hospital, under Mr. Blundell Bankart, many of these cases are treated by manipulation of the back. At the end of 18 months as registrar in this department I have tried to obtain some statistical record of the results of this form of treatment. Although various writers have recorded the results of their operative or other treatment of these disabilities, there appears to be no similar record of the results of manipulation. The object of the present inquiry has been to ascertain the final results of manipulation of the back, and to show its possibilities and limitations in the different conditions which give rise to what American writers have termed "low back pain."

Material Available.

The records of the clinic have been examined from 1921 to October, 1929. During this period 113 patients have undergone manipulation of the back; ten were so treated in the years 1921–25, and 103 from 1925 to October, 1929. Most of the patients have been re-examined, and to all of them a questionaire has been sent. Replies were received from 78 (69 per cent.); one patient had died from other disease, and in two cases the information obtained was inadequate. There remain 75 cases on which these statistics are based, the earliest having been treated in 1921, the latest in October, 1929.

Every patient was asked whether, as the result of manipulation, the condition of the back was cured, improved, unchanged, or worse. Other questions related to duration of after-treatment, length of time off work, both before and after manipulation, and whether there had been any return of pain. It is realised that the answers to such questions vary with the type of patient, and in particular that the term "improved" requires further definition. Such an answer has therefore not been accepted unless the patient has returned to full work and is not getting any more than occasional pain after over-exertion. In this way several patients who expressed themselves as "improved" have been classified finally as "unchanged."

TABLE I.—*Total Cases Manipulated.*

—	Condition.	No.	Sex. M.	Sex. F.	Average age.	Improved	Not improved
						%	%
1	Chronic back strain	30	15	15	36·1	26 (86·7)	4 (13·3)
2	Sacro-iliac strain	25	4	21	35·2	23 (92·0)	2 (8·0)
3	Lumbo-sacral strain	3	1	2	22·3	1 (33·3)	2 (66·7)
4	Spinal arthritis—						
	Secondary sciatica	8	4	4	44·8	4 (50·0)	4 (50·0)
5	Without sciatica	5	4	1	50·6	2 (40·0)	3 (60·0)
6	Neurotic spine	4	0	4	43·3	0 (0)	4 (100)
	Total	75	28	47	37·5	56 (74·7)	19 (25·3)

Manipulation was carried out in every case under an anæsthetic; as a rule nitrous oxide and ether was used, although in a few cases gas alone was given; the better relaxation given by ether is generally desirable. The manipulation consists essentially of forcible flexion of the spine, a rotatory movement of the pelvis first to one side and then to the other (the "osteopath's twist"), and finally forcible hyper-

extension of the whole spinal column. In some cases lateral flexion is added. The purpose of the procedure is to restore the normal range of spinal movements. The patient gets up on the day after manipulation, starts massage and exercises on the second day, and is discharged on the third day. The after-treatment is designed to maintain the mobilisation produced by manipulation, and massage is gradually replaced by exercises which the patient can carry out at home. Table I. shows the total number of cases manipulated, classified in their several groups; those cured or improved are tabulated under the heading "improved," whilst those unchanged or worse are called "not improved."

Influence of Trauma.

In the cases labelled "strain" (Groups 1, 2, and 3) it was possible to obtain a definite history of injury in 38—i.e., 65·5 per cent.; some gave a history of sudden onset without trauma, in some the pain followed operations or childbirth, and in the remainder the cause was probably postural. It is noteworthy that the results of manipulative treatment were better in cases which were definitely traumatic in origin, as shown in Table II.; moreover, the replies from these patients were more enthusiastic.

TABLE II.—*Total Cases giving a Definite History of Trauma (38).*

A—Improved	"Cured"	15	37 (97·4) %
	"Improved"	22	
B—Not improved	"Unchanged"	1	1 (2·6) %
	"Worse"	0	

The one traumatic case not improved was a chronic back strain which was manipulated in July, 1928; the woman did not return for further treatment, but resumed work after three weeks.

The nature of the exciting injury has been ascertained in these 38 cases, and is shown in Table III.

TABLE III.

—	Fall.	Lifting.	Stooping.	Blow.	Football.	Misc.	Total.	
Chronic back strain	6	7	3	4	1	2	23	38
Sacro-iliac strain	8	3	—	1	1	1	14	
Lumbo-sacral strain	1	—	—	—	—	—	1	

In most cases the injury was produced by a sudden unguarded movement; in some it was due to lifting or carrying an unusually heavy weight, and in a few it was occupational.

Value of X Rays.

X rays were taken in the majority of the cases; this is now done as a routine, but in the strain groups it is a negative X ray which confirms the diagnosis. Apart from showing gross arthritis when present, X rays have revealed the existence of anatomical anomalies such as sacralisation of the last lumbar vertebra, articular tropism or spina bifida, but in no case has this appeared to affect the diagnosis. Calcified glands have also been shown in some cases and fracture of a lumbar transverse process in one; this patient had sacro-iliac strain on the same side which was successfully treated by manipulation, the fractured process producing no symptoms.

TABLE IV.—*Chronic Back Strain.*

Total cases—30. (M. 15, F. 15.)				Traumatic cases 23	
A—Improved	"Cured"	13	26 = 86·7 %	10	22 = 95·2 %
	"Improved"	13		12	
B—Not improved	"Unchanged"	4	4 = 13·3 %	1	1 = 4·8 %
	"Worse"	0		0	

Of the four cases classed as "not improved" in Table IV. three have not returned for further treatment. One has been seen recently and now states that she is improving with continued massage and exercises. The term "chronic back strain" is used to denote a lesion in some part of a comparatively wide area, but in most cases it is applied to a strain of the erector spinæ or the ligaments deep to it. The typical history is of a stabbing pain following a sudden movement made in falling or lifting. On examination there is a tender spot over some part of the erector spinæ; the affected muscle is in spasm, and lateral flexion away from that side is painful and limited; X ray is negative. The underlying pathology is probably the tearing of a few muscular or ligamentous fibres, producing a little hæmorrhage and followed by the formation of fibrous tissue which causes pain when it is stretched. Manipulation aims at putting the joints of the spinal column through a full range of movements and breaking down any fibrous adhesions.

A male, aged 39, a general worker in a cemetery, five years previously, whilst digging, felt as if something had snapped in his back. Since then he had had pain in the left side of the back, aching and gripping in character, and he had been unable to work for a year. On examination there was tenderness over the left erector spinæ with spasm and limitation of movement. The back was manipulated in April, 1927; he had massage and exercises for a month and returned to work in two months. Two and a half years later he reported that there had been no return of pain.

It was necessary to repeat the manipulation in four cases in this group and in one a spinal support was given.

TABLE V.—*Sacro-iliac Strain.*

Total cases—25. (M. 4, F. 21.)				Traumatic cases 14	
A—Improved	"Cured"	5	23 = 92·0 %	5	14 = 100 %
	"Improved"	18		9	
B—Not improved	"Unchanged"	2	2 = 8·0 %	0	
	"Worse"	0		0	

Both the cases not improved in Table V. have had arthrodesis of the affected joint (Smith-Petersen operation); in one the pain was relieved on the operated side but recurred on the other side 18 months later, and she is now awaiting arthrodesis of that side. The other was operated on only six weeks ago, and her condition is so far satisfactory. Sacro-iliac strain is regarded as a genuine condition giving a constant characteristic clinical picture. There is usually a history of a sudden unguarded movement, as in a fall, which produces pain localised to one or other sacro-iliac joint; subsequently there is a peculiar sense of insecurity. On examination the most important sign is tenderness localised to the posterior superior iliac spine and just below it; this is elicited by observing the patient wince on deep palpation in this spot and not by asking "does that hurt?" Another constant sign is pain referred to the joint on raising the leg with the knee extended; pain on compression or separation of the iliac crests is sometimes present. There is no sign of gross disease and X ray is negative. The pathological condition is assumed to be due to a strain of the whole sacro-iliac joint; the normal range of movement in this joint is small, and a slight excess of movement produces strain. Tuberculous disease here is not common, and the patient rarely comes before an abscess has formed or positive X ray signs are present. In some cases there may be arthritis of the joint associated with a general spinal arthritis. In manipulation the twisting movement is the most important, and is usually productive of cracking sounds assumed to be due to the tearing of adhesions.

A female, aged 26, a shop assistant, complained of pain in the lower part of the right side of the back for three months; it had come on after carrying a heavy suit case and was worse on going upstairs. On examination there was tenderness localised to the right posterior superior spine on direct pressure, and pain here on flexion of the right thigh with the knee extended. The back was manipulated in November, 1925, and she returned to work in a week; four years later she reported that the treatment had been very successful and that there had been no return of pain.

Statistically, this is the most satisfactory group, but the percentage of complete cures is not so high as in the chronic back strains. It was also necessary to manipulate twice in five cases and three times in four. Cases which do not respond to manipulation can be cured by immobilisation by arthrodesis.

Table VI. does not represent the proportion of cases of lumbo-sacral strain attending the clinic; they are not usually manipulated, as it has been found

TABLE VI.—*Lumbo-sacral Strain.*

	Total cases—3. (M. 1, F. 2.)			Traumatic cases 1.
A—Improved	"Cured"	0	1 = 33·3 %	0 1 = 1 100 %
	"Improved"	1		
B—Not improved	"Unchanged"	2	2 = 66·7 %	0
	"Worse"	0		0

elsewhere that they are not as a rule permanently improved by manipulation. The characteristic clinical feature is tenderness localised accurately to the lumbo-sacral junction in the mid-line and just to either side of it. There is usually pain on hyperextension, whilst flexion is free, being carried out at the inter-vertebral joints above the lumbo-sacral junction.

A male, aged 15½, an apprentice fitter, had fallen on to his back in the gymnasium two years previously and had since complained of increasing pain over the sacrum. On examination there was tenderness in the mid-line at the lumbo-sacral junction; flexion was free, but hyperextension and lateral flexion were resisted. There was some spasm of each erector spinæ but no deformity of the spine. The back was manipulated on Dec. 5th, 1927, and he had massage and exercises for three months, after which time he was quite well. Pain returned in February, 1929, and was relieved by exercises in one month. It recurred in September, 1929, and was relieved by a further two months' course of exercises.

The recurrence of pain in lumbo-sacral strain after manipulation is also illustrated by one of the cases already included as sacro-iliac strain.

She strained her back whilst shaking a mat, and when examined had a typical left sacro-iliac strain. During the time she was waiting to come in for manipulation she fell downstairs and hurt the lower part of the back, but made no mention of this until a year after manipulation, when she returned. The sacro-iliac pain was entirely cured, but the lumbo-sacral pain had returned three months after manipulation, and on examination she was found to have a typical lumbo-sacral strain. Further mobilisation has now been attempted by stripping the soft parts from the fifth lumbar spine and excising it, a method which has already been successfully employed.

It seems impossible to produce sufficient movement at the lumbo-sacral joint by manipulation to cure the condition. The alternative treatment is to immobilise the joint by means of a spinal support or by spinal fusion, as suggested by Hibbs and Albee. The characteristic hyperextension pain may be due to contact between the fifth lumbar and first sacral spines.

TABLE VII.—*Spinal Arthritis with Secondary Sciatica.*

	Total cases—8. (M. 4, F. 4.)		
A—Improved	"Cured"	2	4 = 50 %
	"Improved"	2	
B—Not improved	"Unchanged"	4	4 = 50 %
	"Worse"	0	

Of the four cases in Table VII. classed as "not improved," three underwent excision of the lateral lumbo-sacral joint and fourth and fifth intervertebral joint on the affected side. Of these one was cured, and two improved. The remaining case, a woman of 68, stated that she was a little improved, but still has pain in the back, which is relieved by daily massage at home. Of the four improved cases, two had saline injections into the sciatic nerve in addition to manipulation; in one there was a recurrence of pain in the opposite leg six months after manipulation, which disappeared after complete dental extraction. Patients in this group usually come complaining of "sciatica." On examination there is tenderness over the sciatic notch and sometimes along the course of the sciatic nerve. All movements of the lumbar spine are limited, and the erector spinæ is in spasm; X ray shows lipping of the vertebral bodies, and in some cases of the articular processes, although to show the latter it is necessary, as Putti has pointed out, to have stereoscopic X rays. Other causes of sciatica having been excluded, and septic foci eradicated, treatment is directed to the spine in the first instance, and full mobilisation appears in some cases to be able to lessen the pressure on the nerve roots which is the cause of the referred sciatic pain. Adjuvant measures in the form of radiant heat, massage, and exercises are also given and, if the pain is not relieved, excision of the lateral articulations above and below the fifth lumbar vertebra with consequent decompression of the emerging nerve holds out good hope of success. Massive saline injections may be of some value. A number of patients in this group have expressed the opinion that the exercises they were taught keep them free from pain.

A male, aged 53, a theatre box-office clerk, caught cold 15 months previously and was laid up for 14 days with right-sided sciatica. This has been painful ever since, and there was an exacerbation five weeks ago on lifting a heavy object; since then he has been off work. On examination maximum pain and tenderness were localised to the right sciatic notch; pain radiated down the course of the sciatic nerve to the external malleolus, and at times was felt along the distribution of the twelfth dorsal. The right erector spinæ was in spasm; lateral flexion to the left was not possible, and flexion was limited. X ray showed lipping of the lumbar vertebral bodies. The back was manipulated on March 30th, 1928; saline was injected into the sciatic nerve on April 16th, and again on April 24th; the back was manipulated again on April 29th, and he continued to have massage and exercises for four weeks, but returned to work in a fortnight. In October, 1929, he reported himself "practically cured," and added "prior to being admitted to hospital I was hardly able to crawl about; when I came out I was as straight as a guardsman . . . I ache fairly frequently on the right side of the ribs near to the spine, but I find by carrying out some of the exercises that I was put through when being massaged I get rid of the pain."

TABLE VIII.—*Spinal Arthritis without Sciatica.*

	Total cases—5. (M. 4, F. 1.)		
A—Improved	"Cured"	0	2 = 40 %
	"Improved"	2	
B—Not improved	"Unchanged"	3	3 = 60 %
	"Worse"	0	

Of the three cases in Table VIII. classed as "not improved" one had scoliosis, and manipulation was only done to obtain the maximum amount of correction before fitting a spinal support, after which he was considerably improved; one had massage and exercises for two weeks only and has been unable to continue through other illness, and one, who lived at a distance, had no after-treatment after leaving hospital and has not since returned; in this case gas alone was used as the anæsthetic for manipulation. Clinically these cases give a history of gradually increasing pain in the back, worse after lying or sitting still for any length of time. The whole spine is stiff, and there may be tenderness and spasm of the erector spinæ. X ray shows arthritic changes.

A male, aged 58, a coach painter, noticed pain in the back for six years, of gradual onset with no history of injury; the pain was felt across the lumbar region and in the right loin. He had been kept off work for a month. On examination the lumbar spine was very stiff, but there were no definite points of tenderness. X ray showed osteo-arthritic lipping of the lumbar vertebral bodies. The back was manipulated on Feb. 2nd, 1928, and he had massage and exercises for a month. After this he still had some pain and was fitted with a spinal support; he returned to work four months later and now only has pain at times.

Mobilisation appears to be the best treatment for this group, provided efficient after-treatment can be given to maintain it. The alternative is to produce relative immobilisation by means of a spinal support.

TABLE IX.—*Neurotic Spine.*

	Total cases—4. (M. 0, F. 4.)		
A—Improved	"Cured"	0	
	"Improved"	0	
B—Not improved	"Unchanged"	3	4 = 100 %
	"Worse"	1	

Pain in the back is only one of the many complaints made by the women comprising this group (Table IX.). They have usually attended many other departments

of the hospital and have had more than one operation. When examined they present a widespread tenderness both on superficial and deep palpation over the whole of the back, but the spine is quite flexible; despite their complaints they are generally well nourished and appear healthy. Manipulation is unlikely to produce improvement and is only justifiable when it appears that there has been a strain which forms the underlying basis of their condition. Massage and exercises are also useless. Vigorous faradic stimulation may be of some help, and the more vigorous it is the better they like it; if allowed, they will continue such treatment for years, and they are always willing to describe at length their various pains and the different types of treatment they have undergone. The one patient in the whole series who said she was worse as a result of manipulation wrote six years later: "the pain in the lower part of my back is incessant. Night and day I get no rest from pain." She was re-examined and appeared a strong, healthy woman; she was doing her house work. She still had diffuse tenderness over the whole of the back, but the spine was quite flexible despite the fact that X ray showed a certain amount of osteo-arthritic lipping of the lumbar vertebral bodies.

I have purposely made no references to the very considerable literature on the subject, as I wished to arrive at an unbiased opinion of the value of manipulation based on my own observations on this series of cases.

Summary and Conclusions.

1. In chronic back strain and sacro-iliac strain manipulation is successful in about 90 per cent. of cases, and where there is evidence of definite exciting trauma success may be anticipated in almost all the cases.

2. Cases of lumbo-sacral strain are not permanently improved by manipulation.

3. Spinal arthritis, with or without secondary sciatica, should be treated in the first place by manipulation and exercises; improvement may be expected in about half the cases.

4. Cases of neurotic spine do not respond to manipulation unless there is an underlying strain.

5. Manipulation of the back should not be confined to cases where there is mechanical displacement, but should be more widely practised with the reservations stated above. It must be followed by efficient after-treatment.

It is with very great pleasure that I acknowledge my thanks to Mr. Blundell Bankart for permission to publish these results, and for his continued help and interest in their compilation.

PROVINCIAL EYE HOSPITALS.—Worcester City and County Eye Hospital last year attended to 3956 patients, an increase of 650; in-patients numbered 203. Seven artificial eyes and 1232 pairs of spectacles were supplied.—The Eye, Ear and Throat Hospital for Shropshire and Wales (Shrewsbury) reports its busiest year. There were 7155 cases (in-patients 1444), an increase of 315. The great majority of the patients—3061—suffered from affections of the eye and errors of refraction; 1640 were treated for nose and throat affections, and 723 from diseases of the ear. In the isolation ward 23 cases of ophthalmia neonatorum were treated.

BIRMINGHAM DENTAL HOSPITAL.—Owing to the decision to synchronise the hospital with the calendar year the annual report covers 15 months. In that period over 15,000 patients were treated, an increase of nearly one-third upon the last comparable period. There were nearly 14,000 anæsthetic cases, which showed an almost identical increase. The filling of teeth, which is done entirely by students under qualified supervision, had also grown materially. The surgical committee states that there is room for more students, and expresses the hope that "fresh and keen spirits, especially from public schools" will be forthcoming. It is added that every care is taken by the university authorities to ensure thoroughness in the training of dental students.

A NOTE ON CERTAIN ASPECTS OF THE EPIDEMIOLOGY AND MORBIDITY OF YAWS.

WITH SPECIAL REFERENCE TO FAT METABOLISM.

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IN considering the epidemiology and morbidity of yaws in Tanganyika Territory it may be convenient if I preface my remarks with a brief account of the geography and population of the Territory, and give a table of the numbers and distribution of the cases treated.

Tanganyika Territory is that portion of Eastern Africa bounded on the north by Kenya and Uganda, the east by the Indian Ocean, the south by Portuguese East Africa and Nyasaland, and on the west by North-West Rhodesia, the Congo, and the territories of Uranda and Urundi. Its total area is about 365,000 square miles, which includes some 20,000 square miles of water. Along the coast lies a plain, varying in width from 10 to 40 miles, behind which the country rises gradually to a plateau constituting the greater part of the hinterland. This plateau falls sharply from a general level of 4000 ft. to the level of the lakes (Tanganyika, 2590 ft.; Nyasa, 1607 ft.), which mark the great Rift Valley extending northwards to Lake Naivasha. The climate varies greatly according to the height above sea-level. Roughly four climatic zones can be distinguished, though even among these there are considerable local variations

Four Climatic Zones.

(1) The warm and rather damp coast region with its adjoining hinterland. Here conditions are tropical, though not unpleasant except just before and during the rainy seasons when the heat is trying and the atmosphere humid. The average temperature is 78°F.

(2) The hot and moderately dry zone between the coast and the central plateau (300–2000 ft.). This zone is characterised by low humidity, less rain, and a temperature rather lower but with greater daily and yearly variations.

(3) The hot and dry zone of the central plateau between 2000 and 4000 ft. The climate of this zone differs greatly in parts, but its prevailing characteristics are low humidity, moderate rainfall, a fairly high mean temperature with great daily and yearly variations, sometimes exceeding 36° F. daily.

(4) The semi-temperate regions around the slopes of Kilimanjaro and Meru, of the Usambara Highlands, the Ufipa Plateau, and the mountainous areas of the south-western area (4000–10,000 ft.). Frosts occur at the higher altitudes, and the nights are cold.

There are two well-defined rainy seasons annually. Generally speaking, the long rains begin in February or March and last for two or three months, while the short rainy season extends from October to November, but the rainfall is low for a tropical country, and droughts are not infrequent. The total native population is estimated at 4,319,000.

Variations in Incidence.

In the medical report of Tanganyika Territory for 1925 brief notes were given of the comparative incidence of yaws in the different parts of the territory, and the statement was made that there was "an irregularly shaped area comprising the plateau highlands of Iringa, Tabora (north of the Ugalla river), and Dodoma, wherein the incidence is low." There are naturally pockets, in other places, where somewhat similar conditions hold. In the remainder of the territory the incidence is high, with similar pockets of lower or higher incidence. Although some have suggested that insects and indirect contact through wearing infected clothes may convey the infection,

yaws is, in fact, almost entirely a direct-contact disease. The annual medical report for 1924, containing a table showing the sex incidence of 13,619 cases, indicates that, where the district population is undisturbed to any extent by emigration and immigration, the sex ratio for practical purposes is equal. The factors that modify the ratio are the movements of large numbers of male labourers, unaccompanied by their wives, who pass through treatment centres en route to the various plantations, and the fact that males are better able than females to undertake long and arduous journeys for the purpose of obtaining treatment. I am, however, strongly of the opinion that in those districts where scabies is common the abrasions caused by scratching offer increased facilities for the spread of infection. Water in many places is scarce during the dry season, and personal uncleanliness also has a good deal to do with infection. In the areas referred to above the incidence, in my belief, varies with the altitude, rainfall, fertility of soil (which depends on the geological formation), the amount and quality of the foodstuffs, the level of the culture of the people, and directly with the distribution of the tsetse-fly.

The outstanding features of the higher altitude plateau, from 3500 ft. upwards, are healthier climate, good rainfall, and freedom from tsetse-fly over vast areas, which allows the breeding of cattle. (This is not to say that all higher altitude areas are free from tsetse-fly.) The population of these areas have therefore an ample and well-balanced diet, including meat, a variety of vegetables and milk and its products; therefore the necessary intrinsic and accessory factors for the development of a robust disease-resisting constitution are supplied. Not only is there a low incidence of yaws in these regions, but advanced tertiary lesions are much less frequently observed. Compare these conditions with the lower altitude areas of poor soil and rainfall, where annual periods of partial famine occur, where little animal protein, less fat, and no milk are available, where large areas are fly-ridden and the population lives from one year's end to another largely on rice or cassava. The same areas coincide closely with the distribution of hookworm, where the health of the population as a whole is below par, a high incidence of yaws exists, and gross tertiary lesions are very prevalent. A point of interest is that when natives of the low-lying areas of high incidence are found in employment in the coastal towns, such lesions as they show do not as a rule progress but stay dormant, a fact which may be attributed to the richer and regular nourishment available, hygienic surroundings, and personal cleanliness.

Table showing the Number of Cases of Yaws Treated over a Period of Four Years in the Various Provinces.

Province.	Area sq. miles.	Population in thousands.	Cases treated during 4 yrs. 1924-27	Altitude.		Tsetse-fly.
				Above 2500.	Below 2500.	
Bukoba	11,000	329	14,545	14,545	—	+ +
Central	38,078	506	25,668	12,046	13,622	+ +
Eastern	26,320	432	82,585	—	82,585	+ + +
Iringa	37,527	341	24,647	1,400	23,247	+
Kigoma	59,816	260	15,700	15,700	—	+ +
Lindi	37,355	418	69,320	—	69,320	+ + + +
Mahenge	39,401	211	18,132	—	18,132	+
Mwanza	27,940	702	10,484	10,484	—	+ +
Northern	36,018	329	18,398	18,398	—	+
Tabora	36,744	530	21,233	21,233	—	+ + +
Tanga	13,319	261	17,413	—	17,413	+
	363,518	4,319	318,125	93,806	224,319	

Effects of Low Diet.

It would appear from the above data that low dietetic values, in particular the scarcity of animal protein, and the almost entire absence of fat, milk, calcium, and fat-soluble A, which are intimately associated with calcium metabolism, are the distinctive factors which play an important part in the morbidity and epidemiology of yaws. And when yaws obtains a hold on the human organism and is untreated, one might well speculate whether the late tertiary manifestations, the osteoporotic lesions, may not be a result of the breaking down of calcium reserve, by an interference of *S. pertenue* with fat metabolism and the activity of fat-soluble A, in the circumstances mentioned.

This seems to support the views of Willaman quoted by Berg in his book entitled "Vitamins," (p. 240).

"The various yeasts and micro-organisms are able to synthesise A for their own needs and are therefore independent of supplies from without. Very interesting therefore is the statement of Willaman (if correct) that certain fungi, and notably *Sclerotinia cinerea*, appear to need a supply of A, being otherwise incompetent to form spores. We must assume that, just as in the case of animals (which are all parasitic upon the plant world), the parasitic mode of life of these fungi has led to a degeneration of the parasites in this respect, so that they are no longer competent to satisfy their need for A by independent production, and are compelled to draw upon the stores of the host."

UTILISATION OF IMMUNITY IN TREATMENT OF CANCER.

By J. C. MOTTRAM, M.B. Lond., D.P.H.,

DIRECTOR OF THE RESEARCH DEPARTMENT, RADIUM INSTITUTE, LONDON.

THE subject of cancer immunity has a large literature. Woglom,[1] reviewing the subject in 1929, dealt with 600 papers and used 26,000 words. I cannot do better than quote one of his opening statements; he says "Of these 600 communications a small number are of permanent value, many record unconscious and unnecessary repetitions of previous experiments, and far too large a proportion are ridiculous, for few investigators seem to realise that cancer research is a discipline requiring some apprenticeship and that not everyone with an inoculating needle and a dozen white mice can plunge in and emerge with a discovery." Nevertheless, a short statement is here made in the hope that it may be a help to those contemplating the treatment of cancer patients from the point of view of cancer immunity.

Nothing has been found in cancer immunity analogous to the immunity of bacteriology. Specific antibodies are unknown. Cancer immunity relates entirely to inoculated cancer. There is no evidence, apart from the rare disappearance of spontaneous tumours, that there is any immunity against a spontaneous tumour once it has occurred. Immunity against cancer inoculation can be effected by the inoculation not only of tumour material, but also of normal tissues; practically all tissues are effective. It appears, therefore, that cancer immunity is no more than immunity against a strange tissue, and that inoculated cancer obeys a general law covering the transplantation of tissues from one animal to another, whether normal or cancerous. Just as an animal cannot be immunised against its own cells, so it cannot be immunised against its own cancer. The growth of an inoculated tumour frequently results in immunity, so that after removing the tumour by operation, the animal is found resistant to a second inoculation. Similarly, destroying an inoculated tumour in situ instead of removing it by operation—as, for instance, by X rays or by injecting into it various drugs—frequently leaves the animal resistant at a subsequent inoculation. There is, however, not the smallest reason for anticipating any such resistance in the case of spontaneous tumours similarly treated. It has been claimed that immunity against cancer inoculation can be effected by the inoculation of cancer cells which have had a lethal dose of radiation. Assuming that this is true, there is, however, again

[1] Cancer Review, 1929, iv., 129.

no reason to believe that any benefit will result from treating patients by removing their spontaneous tumours, radiating them in vitro and returning them by inoculation into the patient. Nevertheless, this treatment has been advocated and carried out on patients.

Experimental Results.

It seemed desirable to try this treatment experimentally on tumours produced by tar in mice. A hundred mice were taken, depilated and scarified at the nape of the neck. Tar was applied twice a week down the middle line over a distance of half a centimetre. After two months 45 mice remained alive, the high mortality being due to an epidemic of enteritis. Warts, cutaneous horns, and epitheliomas began to appear after four months. As soon as a cancer was present, accompanied by invasion of the subcutaneous tissues as evidenced by an easily palpable mass of growth beneath the skin, the diseased area was removed by operation and small pieces taken from the base of the growth were inoculated into the right and left flanks. When both these grafts had grown into measurable tumours, one was removed by operation, cut into small pieces, and exposed to a lethal dose of X rays. The exposure to X rays was kindly carried out by Prof. Russ at the Middlesex Hospital. The radiated tumour was finally inoculated into the mouse. The growth of the other graft was then watched to see whether the inoculation of the radiated tumour effected it in any way. Only six mice survived these long and severe experimental procedures. In some cases the grafts did not grow, or grew on one side only; in others the wound became infected, or the primary growth recurred and killed the animal.

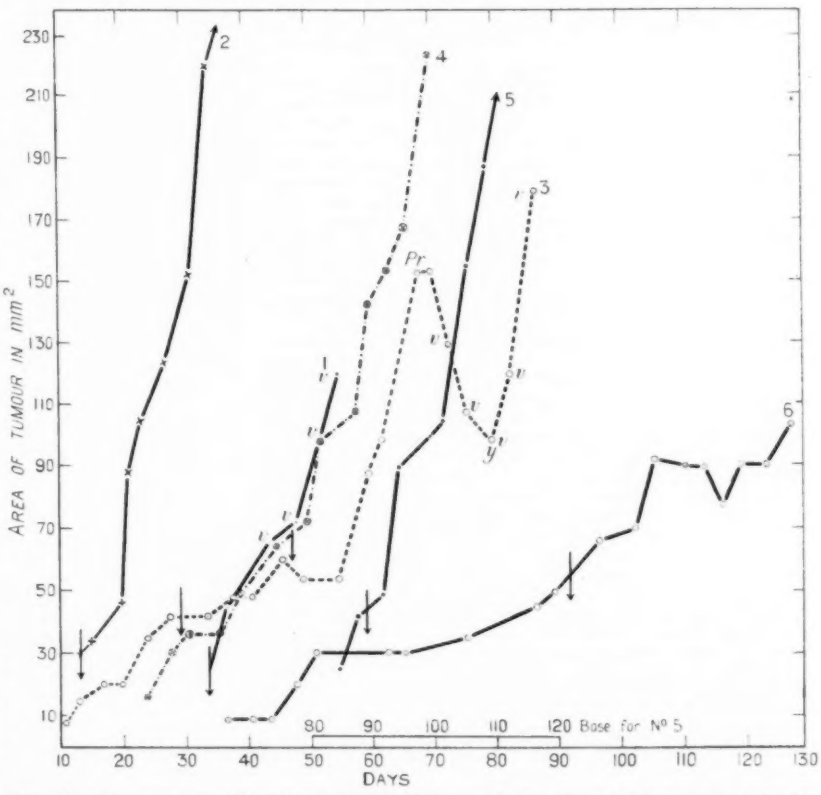
The following table gives the histories of these six mice; the figures represent days.

First operation.—Removal of primary tumour, graft placed on either side.
Second operation.—Removal of a graft radiation and re-inoculation.

—	Tarring stopped.	Operation—		Death.
		First.	Second.	
1	145	150	179	205 K
2	156	171	186	208 K
3	132	195	223	279 K
4	195	205	253	275 K
5	274	309*	398	426
6	?	374† 213	310	337

* Graft grew one side only. † Replaced on both sides.

The growth of the graft left behind at the second operation before and after the inoculation of the irradiated tumour constitutes the test; this information is given in the chart, where it is seen that the growth is progressive in the case of animals 1, 2, 4, and 5, and that there is no evidence of any retarding influence as a result of inoculating radiated tumour tissue. In mouse 3 there was a period of regression on the seventieth day, but this was associated with pregnancy, and when the young were born and removed growth at once again became progressive.



The chart shows the growth of the auto-grafts before and after the animals were treated with radiated tumour emulsion. Arrow = radiated tumour inoculated; Pr. = pregnant; Y = young born; U = tumour ulcerated.

In mouse 6 the tumour was a slow-growing and variable one, but on the whole growth was not altered by the treatment. In this mouse extensive central necrosis of the tumour was present and accounted for the quick fluctuations in the size of the tumour. It is concluded, therefore, that the treatment had no effect on the growth of the grafts.

Discussion.

Although the experiments are entirely negative, it seems desirable to publish them in detail because treatment of patients along these lines has been tried, and is being recommended. For reasons given in the introduction, all treatment of patients based on experiments with inoculated cancer are open to the criticism that human conditions are not reproduced in inoculated cancer, but it is possible to carry out experiments with spontaneous tumours in animals, as has been done here, and until this has been done and shown to be effective trials on patients are not justifiable.

The cancer cell does differ from the normal cells of the host, and this very difference enables one to postulate the possibility of cancer immunity set up in an animal against its own tumour, although so far it has not been demonstrated.

Conclusion.

The treatment of mice bearing spontaneous tumours by the inoculation of irradiated tumour has no influence on the growth of these spontaneous tumours. Results obtained with inoculated cancer do not justify the treatment of cancer patients in a similar manner.

Clinical and Laboratory Notes.

A METHOD OF ESTIMATING THE RATE OF FLOW OF BLOOD THROUGH CAPILLARIES.

BY I. HARRIS, M.D. KÖNIGSBERG,
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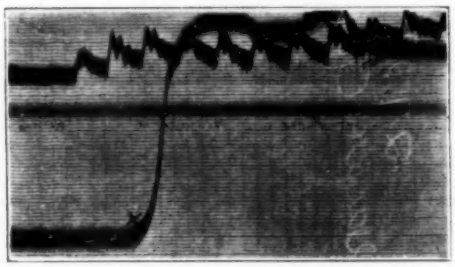
THE determination of rate of blood flow is of great practical importance. In recent times it has been more and more realised that the peripheral circulation plays an important part in heart failure, and stasis and cyanosis largely depend on the rate of flow in the peripheral circulation. As an example of the importance of the rate of flow in practical medicine I will mention the work of Eppinger and his co-workers, who brought forward convincing evidence that cardiac asthma is due to acceleration of blood flow in the peripheral circulation. They also found that morphia slows the circulation and accordingly recommend this drug for cardiac asthma. From my own experience I can testify to the usefulness of morphia in this type of cardiac affection. Obviously the time it takes for the blood stream to traverse the course from the arteries to the veins is the most vital fact in the solution of the majority of the problems of circulation, and it is particularly vital in cases of high



The upper wave is the radial pulse; the lower is the manometer record. × Signifies the time when the venous pressure rises. Time in fifths of a second.

blood pressure. The following method has been employed to estimate the time from the moment the blood stream leaves the arteries to that of reaching the veins.

The armlet of a blood pressure apparatus is placed on the arm. Lower down the basilic vein is connected by means of a needle and tubing to a water manometer. On the wrist the pad of a McKenzie's polygraph is placed on the radial artery and connected by means of rubber tubing to one of the pens of the instrument. The water manometer is also connected by tubing to another pen of the polygraph. The two pens are placed in such a position that their movements can be photographed by means of an apparatus such as is available on the electro cardiograph, to which also a time-marker is attached. Air is now pumped into the armlet, and the pulse completely obliterated. The level of the water manometer connected with the vein will now remain stationary. The pressure in the armlet is suddenly released, but sufficient pressure is left to prevent circulation in the veins of the arm. The pulse-wave which now passes through the radial artery will be automatically recorded on the photographic plate. An appreciable time afterwards the pressure in the water manometer will rise, which will also be recorded automatically on the same plate (see Figure). All that is necessary now is to ascertain the duration of the interval between the appearance of the pulse and the rise of pressure in the water manometer.

A more suitable method which, however, requires special apparatus, is as follows. A drum covered with photographic paper is placed in a box with a slit; the drum is rotated by clockwork. Opposite to the slit is placed the water manometer, a time-marker, and a pen connected by a pad to the radial pulse. Better photographic results are obtained if a cork is allowed to float on the water of the manometer.

It is, of course, necessary to take the ordinary precautions against coagulation.

That this method is reliable is seen from the fact that repeated examinations of the same patient, under similar conditions, give approximately the same results, and that variation of the flow of the blood in the arm, brought about by the application of hot water or ice, gives readings which show an acceleration or slowing respectively of the rate of flow of the blood through the hand.

The same method can be used at the same time for estimation of the cardiac output. The number of beats allowed to pass through the armlet is recorded on the photograph. All that is necessary is to ascertain from the manometer the rise of the water column. It will, of course, be found that the rise in the pressure stands in definite relation to the number of beats permitted to pass through the armlet.

A CASE OF CÆSAREAN HYSTERECTOMY FOR FIBROIDS ASSOCIATED WITH CONGENITAL RECTO-VULVAL FISTULA.*

BY A. M. CLAYE, M.D. LEEDS, F.R.C.S. ENG.,
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A PRIMIGRAVIDA, aged 34, first attended the antenatal clinic at the Leeds Maternity Hospital on Oct. 16th, 1929.

There was no previous medical history of note; menstruation had always been regular, 3/28, not excessive. The course of the pregnancy had been normal except for a fortnight's heartburn and sickness immediately prior to booking. She was about 26 weeks pregnant. On inspection of the vulval region there was a pigmented impervious depression at the normal site of the anus, and the lower end of the bowel opened into the vulva just behind the posterior margin of the hymen. Control of the bowels had always been good except when there was diarrhœa; at these times there was occasionally incontinence. On digital examination the opening gripped the finger.

When seen on Feb. 13th, 1930, the patient had been in labour four hours and the membranes were ruptured: there were several fibroids palpable abdominally, the largest being on the left side, about half the size of a cricket ball, and soft. On rectal examination another fibroid of the same size was felt in the pouch of Douglas. The head could not be pressed into the pelvis. I decided to do Cæsarean section.

On laparotomy the two fibroids specifically mentioned were seen, and several smaller ones. That in the pouch of Douglas was adherent to the rectum. The adhesions were separated and after Cæsarean section and delivery of a live male child, weighing 6 lb. 6 oz., subtotal hysterectomy was performed. The patient made an uneventful recovery, and the baby did well.

I can find very few references in the medical literature to recto-anal deformities associated with labour. O. Smiley [1] reported a case of Mother with Imperforate Anus delivered of Normal Child in the United States in 1911. The rectum opened into the vagina 2 inches from the vaginal orifice. The patient was a primigravida of 27; she also had hypospadias. Delivery was effected with the forceps on account of delay. There was retention of urine for 30 hours afterwards, and attempts at catheterisation failed; the condition was relieved by the injection of 2 per cent. boric acid into the bladder, 21 oz. of urine

* Read to the North of England Obstetrical and Gynæcological Society on April 11th.

[1] Jour. Amer. Med. Assoc., 1911, lvii., 2047.

being passed 15 minutes later. The patient developed sepsis, the temperature being raised, with offensive excessive uterine discharge, from the third to the twelfth day; subsequently the condition settled. In 1925 P. R. Cooper [2] reported a case of Labour with Vulval Anus: Prevention of Vulvo-anal Rupture. The anus was in the same situation as in my case—i.e., the common type of congenital fistula was present. The patient was a primigravida of 24. When the head began to appear, it was thought certain that a rupture of the ano-vulval diaphragm would occur unless steps were taken. A right episiotomy was done, which after suture subsequently healed by first intention; the ano-vulval membrane was undamaged. E. C. Brenner [3] in a paper on Congenital Defects of the Anus and Rectum quotes Morgagni as reporting the case of a woman who lived a hundred years, bore several children and never knew of her abnormality. The reference in Morgagni was turned up for me, but no mention of the fact that the woman had borne children could be found.

Medical Societies.

ROYAL SOCIETY OF MEDICINE.

SECTION OF MEDICINE.

A MEETING of this Section was held on April 25th, with Dr. R. A. YOUNG, the President, in the chair.

CHRONIC ARTHRITIS TREATED BY GANGLIONECTOMY.

Dr. L. G. ROWNTREE (Rochester, U.S.A.) gave a cinema demonstration of the results of treating chronic arthritis by ganglionectomy. Eighteen such operations had been performed at the Mayo Clinic, he said, on 17 patients. The most encouraging results had been obtained in the chronic cases of arthritis deformans without marked osseous change. He related the case of a young woman who was told by the physicians that she must spend the remainder of her life in bed. She had had arthritis for six years, and was incapacitated, though she was the wage-earner of the family, her mother being an invalid. Dr. Rowntree reasoned that everything done for chronic arthritis had the effect of increasing the circulation and warming the joints; this was true also of treatment for Raynaud's disease. It seemed that such an increase of warmth and circulation was all that was needed to relieve the pain of chronic arthritis. In this case the patient's joints were cold, clammy, and the pain was worse in a storm. Two and a half years after ganglionectomy, however, there was nothing the matter with her legs, and she was walking well. Within six weeks of the operation she was without pain, and had perfect control of her legs, but there was still a good deal of arthritis in the upper extremities, and the pain of this robbed her of sleep. When she tried to raise her arms she had tremor, and there was muscular atrophy of the hands, with much swelling over the knuckles. Therefore the last cervical and the first two dorsal nerves were removed, all the rami being cut. After the operation she was able readily to raise both her hands over her head, and there was no tremor nor pain; there was good movement of the hands, and the atrophy was disappearing.

A girl, aged 16, had cold, clammy feet and painful ankles and knees. She was two months in the wards of the hospital and had previously had eight months of medical treatment elsewhere. Four weeks after ganglionectomy she was trying to walk and there was no more pain. In six weeks she was able to walk without any help; later she was dancing, and returned to school. The legs were still somewhat weak, and there was a little deformity of the spine, which he did not touch.

A woman, aged 44, had a subacute arthritis with fever and anæmia. Six months of ordinary treatment brought no improvement. In May of last year ganglionectomy was done for disability of the upper extremities, and immediately after the operation her fever disappeared and never returned. No further transfusions for her anæmia were carried out after the operation. She asked to be operated upon for the condition in her feet, but this was declined.

A man, aged 26, had osseous arthritis of 12 years' standing. He had a loudly clicking hip with extreme pain. All treatment tried in the course of 12 years failed and five weeks' further treatment in the hospital had no effect. In him the operation achieved nothing except relief of pain in the feet, the main seat of trouble being the hip.

A woman, aged 23, had been ill for 11 years, and had had treatment by autogenous vaccines and otherwise. She screamed whenever she was moved, and very little movement was possible in the legs; radiographic examination under an anæsthetic indicated that her legs were ankylosed, for they could not be flexed. The operation gave her more movement and relieved all the pain in her feet and ankles; the pain in the right hip greatly diminished. In less than three months after the operation she could walk alone, with the aid of a stick. Nine months after the operation she was walking all about the house, with very little pain. Dr. Rowntree thought this patient still had a long way to go, but she could make the journey. Evidently the ankylosis was fibrous, not osseous.

After describing and depicting a number of other cases Dr. Rowntree said that a marked increase in muscle tone and in strength was always noticeable after the operation, along with disappearance of the deformity and the trophic changes. Ganglionectomy was not a panacea; the cases had to be very carefully selected—namely, those with cold, clammy hands and feet, and conspicuous sweating. Results were best in the young. The joints most benefited by the operation were the hands, feet, ankles, and wrists. The improvement in knees and elbows came about more slowly but was definite. The shoulders and hips did not give such good results. Where there was much osseous change the condition did not seem to get much better during the period the patients were under observation. But in the cases most suitable the results deserved the term miraculous. There had been no deaths in this series.

The abdominal approach to the ganglion was of the type described by Hunter and Royle. There had been no difficulty in the operation, except that two patients had had a mild illness, following upon an intestinal disturbance after the operation. Sometimes this took the form of stasis, sometimes diarrhœa. After the initial incision the ganglia were in view in front of the surgeon, and could be removed en bloc without any difficulty. Dr. Adson, who did the operations, hesitated for two years about operating for disability of the arms, for he was not quite certain what should be done. He made, for this, the posterior approach, cutting through the upper ribs and exposing the last cervical and first and second dorsal, and removing them en bloc. The only complication from this was in the case of a woman who had pleurisy for a few days. Though the operation was one of considerable magnitude, and should only be done by neurological surgeons, it should not cause them undue anxiety. Nothing morphologically wrong with the tissues could be detected in these cases and he had seen many ganglia removed in animals apparently without any untoward effect. Nor was there any cardiac insufficiency after the operation.

Some of the above statements were made in answer to questions, and at the end of the demonstration the PRESIDENT commented on the satisfaction which would be felt that something could now be done to help these sorely afflicted people. It was surprising how many parts of the body could be dispensed with.

Prof. W. E. DIXON, F.R.S., and Dr. G. N. MYERS contributed a paper on the

CURATIVE ACTION OF DIGITALIS IN TOXÆMIA.

Prof. DIXON said the work was done to discover whether digitalis was valuable in pneumonia, a matter on which opinion was divided. Some said that if digitalis was used in pneumonia, the patient was more

[2] Clin. Jour., 1925, liv., 155.
[3] Surg., Gyn., and Obst., 1915, xx., 579.

liable to die, while others produced statistics to show that more patients were cured of pneumonia when digitalis was given than when it was not. In nearly every fatal case the death was from toxæmia. Like all microbial infections pneumonia produced a condition of shock, shown by a gradual fall in blood pressure and an enormous dilatation of the splanchnic area; the heart continued to beat normally, and the central nervous system remained active. The shock might, therefore, be due to an action on the central nervous system.

For the experiments diphtheria toxin was ultimately the one selected, on the ground that the dose could be accurately measured; 1/350th of a cubic centimetre killed 95 per cent. of the guinea-pigs which were injected with it. There were two groups of experimental animals; both received the toxin, and one group also had digitalis under certain conditions. Hundreds of tests showed conclusively that if a reliable tincture of digitalis was given to animals they survived subsequent injections of bacterial toxin, even if three times the minimum lethal dose of toxin was given. The same effect was obtained if the toxin was injected first, so long as the use of digitalis was not much delayed. The glucosides from digitalis and strophanthin also showed a life-saving effect, though not to the same extent as that seen after digitalis. The other substance, ouabain, which was used in America as a standard for their digitalis, was a glucoside belonging to the same group, and it was the only one which could be weighed out accurately. It acted as an ideal control because it was valueless in toxæmia, though within a few hours it acted on the heart in the same way as digitalis. Animals which received ouabain died more readily than did those which received the toxin alone. Strophanthus acted quickly on the heart—i.e., it had the action which the physician desired in pneumonia—but if it were given to animals for two days it had no beneficial effect in curing the toxæmia; it must be given for some length of time for this to happen. Given this condition, strophanthus was almost as good as digitalis.

Digitalis had a negligible effect on the leucocytes in normal animals, but digitalised animals showed a decided leucocytosis. It seemed that digitalis, in taking time to act, occupied some portion of the cardiac structure to which the toxin normally attached itself. If digitalis was given to the heart first, the toxin was without effect; but if the toxin was put in first and was allowed plenty of time to act, digitalis afterwards had no effect. Digitalis did not act any more quickly on injection than when given by the mouth. Large doses were required to cause any alteration in the T-wave of the electrocardiogram. This research encouraged the idea that there might be other drugs which might limit or check the activities of pathological organisms in the body. Some hydrologists had recently claimed that the waters of their spas had an antitoxic or detoxicating effect on certain bacterial infections.

MEDICO-LEGAL SOCIETY.

AT a meeting of this Society on April 24th, with Lord RIDDELL, the President, in the chair, a discussion took place on

GONORRHŒA FROM THE MEDICO-LEGAL POINT OF VIEW.

Dr. KNYVETT GORDON, in opening, said his object was to clear up some of the difficulties apt to arise when a case of gonorrhœa emerged from the doctor's consulting room into the solicitor's office or a court of justice. His remarks were based upon the examination of some 7000 specimens from cases of suspected gonorrhœa, and upon experience as a witness in courts.

In the male, when the gonococcus gained entry into the genital organs, the inflammation was accompanied by a discharge, which might be either profuse or so scanty as almost to escape notice. In either case the organism might be confined to a small part of the urethra, or it might get into recesses and glands and lurk there for a long time, its dislodgment being very difficult. The man might then have no discharge, and, under the belief that he was cured, he might marry, and so infect his wife. The female canal had even more recesses and glands than the male, and the organism got into the oviducts, which at their further end opened into the general peritoneal cavity. Thus in women not only was the disease more difficult to cure, but the gonococci were less accessible to the pathologist. If the organism entered the eye, the intense inflammation might lead to blindness; probably half the complete and incurable blindness of babies was caused by contact with the gonococcus in the passages of the mother during birth. One of the complications of the disease was rheumatism and a very definite accompaniment was intense mental depression.

The Social Significance of Gonorrhœa.

It was quite common for an attack of gonorrhœa in the male to be regarded as of little present and almost negligible significance in the future, and as easily curable in any case. This was because after a time the discharge might cease, even when there had been no treatment. Dr. Gordon, however, believed that real cure was even more difficult than in syphilis. For obvious reasons, the fact of having gonorrhœa was often concealed by the patient, so that no doctor was consulted; even if medical treatment was sought, attendance ceased when there was no further discharge, though at this stage a cure might be brought about. In the male the gonococcus might attack the spermatozoa factories, the patient being thus rendered sterile for the rest of his life, even when he had passed the stage of infectivity. The effects on the female were even more serious, for the gonococci sealed up the oviducts so that ova could not reach the uterus. Gonorrhœa was now more common than formerly, because illicit sexual intercourse was no longer synonymous with prostitution, and unmarried women were no longer divided into virgines intactæ and prostitutes. The amateurs were more numerous and more dangerous than professionals—more dangerous because most of them did not know they had the disease. Secrecy of treatment at clinics was relative rather than absolute, especially in country districts. Though from the medical standpoint compulsory notification was easily defensible, he believed that it was impracticable in this country and even if introduced would put a premium on concealment, and thus lead to increased total infection.

Identification of the Organism.

In the male the gonococcus was not difficult to recognise when found, but in the female its discovery was much harder and it had to be differentiated from a number of other organisms which inhabited the genital canal and resembled it. A report on a single swab was valueless for purposes of a decision in court, for an opinion was not proof. The gonococcus was a Gram-negative intracellular diplococcus. In the hands of an expert, Gram's method was entirely reliable, but if carelessly used it might be fallacious. The crucial test of animal inoculation could not be employed, for gonorrhœa could not be communicated to laboratory animals. Two procedures remained: culture and the complement-fixation test. If a positive result was obtained by culture, he believed it was accepted by the court as conclusive evidence of gonorrhœa in the patient, just as it would be accepted by a pathologist. But culture did not always come off, selective media being very sensitive, and a negative result was valueless. The complement-fixation test he regarded as less useful; it gave a positive result in only 40 per cent. of cases of true gonorrhœa, and sometimes a false "positive" was obtained. In addition, it told nothing about the infectivity of the patient. He did not now perform this test.

Infectivity could be determined only by bacteriological tests, and clinical opinion alone should never be accepted.

An important question was whether the finding of the gonococcus was evidence of venereal infection by that disease. In the male one could dogmatically say that if gonococci were found in the urethra, only sexual intercourse could have placed them there, for these organisms were incapable of independent movement. Hence, the infected lavatory must be ruled out as a possible cause, and such an excuse did not prevail with the courts. In the female the case was different. Many women, especially married ones, suffered from a discharge associated with some inflammation of the parts, and both features were indistinguishable from gonorrhœa. Ignorance could scarcely have worse results than where it led to an inaccurate report of gonococcal infection. A case had been heard in the Divorce Court in which the judge ruled that the organisms found were gonococci, though this was against the evidence of bacteriologists; it was also ruled that the woman could only have contracted the disease from her husband, despite the fact that repeated bacteriological tests failed to detect gonococci. On the discovery in young girls of an organism resembling the gonococcus, accusations of rape had been made against innocent men.

A Series of Questions.

There were several questions on which Dr. Gordon sought opinion from legal members. First, seeing how easily the gonococci could get on towels and other articles of common use, was concealment of an attack and neglect to take due precautions an offence? Would it justify dismissal of an employee? The second was, could an unmarried man or woman recover against the other party damages because of alleged contraction of the disease in illicit intercourse? Thirdly, presumably infection of a partner in marriage was a form of cruelty and constituted a ground for legal separation. If the man or woman believed himself or herself to have been cured, what difference did this make in the eyes of the law? If the husband was sterile as a result of an old attack of gonorrhœa, there being no question of infectivity, would this justify a decree of nullity? And in the case of one-child sterility, if a woman forgave infection by her husband before she realised that gonorrhœa had sealed up her tubes, had she a remedy when she learned she could not again bear children? He particularly invited legal contributions on the question of compulsory notification.

Clinical Diagnosis.

Dr. F. J. McCANN agreed that gonorrhœa was not treated by the community generally with the respect its gravity called for. In diagnosis he thought too much reliance was placed on the bacteriologist; his view was that certain cases of the disease could be recognised clinically. If a previously healthy woman suddenly had a discharge, accompanied by local swelling, and pain on micturition, she could be held to be suffering from gonorrhœa, since nothing else caused this group of symptoms. The same was true of a conjoint infection of the cervix, the urethra, and Bartolin's glands; and if tubercle or infection from the bowel could be excluded, double tubal disease meant gonorrhœa in 999 cases out of 1000. The diagnosis of the disease had not yet reached the stage of precision necessary in the witness-box. If one waited too long before taking material for investigation, it was easy for the delicate gonococcus to be overgrown by more vigorous pus organisms. Specimens for this purpose should not be taken from the vagina but from the urethra, and with a sterilised platinum needle. It was very difficult to cultivate the gonococcus. In cases of doubt he thought attention should be paid in court to clinical evidence.

Mr. ERNEST CLARKE remarked that ophthalmia neonatorum was now becoming less in incidence on account of the care now exercised in antenatal clinics, especially when the mother was known to have the disease. He had often wondered what was the legal position when a healthy woman was married to a man who gave her gonorrhœa and thus caused blindness in her child. Could she obtain a separation from her husband for this?

Legal Views.

Mr. W. G. EARENGEY pointed out that to have gonorrhœa was not in itself an offence, and an infected person who was known to have been neglectful and to have communicated the disease to another could not be brought to justice in a criminal court. An employer could do nothing more than give such infected person notice to leave, or, failing such notice, pay him the money due. When a man imparted the disease to the woman he married, the infection was not cruelty unless he did it knowingly, nor was the woman entitled to separation or other remedy; in other words, it was included in the risk or chance she took when she married. If, however, he knew he had the disease before coitus, the infection was legal cruelty. A husband could not sue his wife, nor a wife her husband for a tort. If a man infected an unmarried woman there would be no right of legal action, for the woman would have to rely on something which was against public policy; it would be against public policy for the court to enforce any imaginary right she might have for damages, because the court would have to consider the circumstances in which the disease was communicated. Nor could a married woman take action against her husband for assault because he had infected her. The wife—unless her consent could be shown to have been obtained by fraud—must be held to have given consent to the act. If, however, after a wife had condoned her husband's fault he again lapsed, that cancelled the condonation, and the previous grounds could then be brought forward. Mr. Earengey did not see why compulsory notification should not be made part of the law; and if this were done it would naturally become an offence to impart the disease.

Mr. BARRY O'BRIEN remarked on the importance given in the courts to proof of infidelity on the part of a husband or a wife. If a woman brought an action against her husband in the Divorce Court because he had a gonococcal infection and he said he had never had intercourse with anyone else since marriage, what support was the medical man able to give to his contention that the man's disease must be a latent infection reawakened?

Mr. W. S. JONES said that surely it was possible to give an employee immediate notice if he contracted gonorrhœa. An employer who did not do so was laying himself open to an action for negligence, for other employees might be infected.

Dr. TEMPLE GRAY said a servant could not be dismissed without notice and without wages except for breaking an implied contract; there was no implication that such servant would maintain himself or herself in a certain condition of health. If such a case occurred in his own household, however, he would risk the consequences and would send the servant away forthwith. He asked whether there was any overt sign by which it could be known at about what date the husband had contracted the disease. If a man could not know when it was safe to marry if he had once had the disease, no such man could ever marry with a clear conscience.

Compulsory Notification.

Dr. LETITIA FAIRFIELD said she almost regretted that the opening paper had been read to an audience containing lawyers, for they might assume it was impossible to be certain that any person had ever had gonorrhœa. For a number of years she had been associated with public health work and after the war she had much to do with starting treatment schemes, when there was a good deal of public ignorance about venereal diseases. In a voluntary organisation she had read many thousands of letters which showed very pathetic results of the spread of these diseases. She hoped that juries would not

place too rigid a reliance on the bacteriological tests when a case was before them; the clinical observations should be given an important place. Only very rarely was infection of girls the result of a criminal assault. She did not think the question of compulsory notification was so simple as would appear from some of the remarks. It was not that one hesitated to bring publicity on the sufferer; nor was it in connexion with acute cases that difficulties occurred, for these people were ill and depressed, and even suicidal, and longed for relief. The difficulties were in the class of case in which proof was not at all easy, however it was approached. The Ministry of Health was against the notification of gonorrhœa, feeling that the disease was already difficult enough to get under treatment, and that under notification there would be a great dread, with consequent concealment. In Sweden, where venereal disease was notified, there had been a great diminution in the incidence of syphilis, but it had not affected the incidence of gonorrhœa. The average attendance at clinics was greater in London than anywhere else, and much more good was done by winning the confidence of patients than by trying to hold the disease in check by compulsory methods.

Dr. ERIC DOBSON thought it seemed clear that, irrespective of the patient's or anybody else's feelings, compulsory notification of every venereal disease would be an excellent course. But how would this affect professional secrecy? Also, what action would lie against the notifier for defamation of character or, in the event of subsequent separation or divorce proceedings, for damages? The practitioner was sure to lose his patient, and the latter would let it be freely known in the district that the doctor had got him into trouble through the notification. Dr. Dobson agreed with those who said that compulsory notification would lead to greater concealment than at present. He thought members of the medical profession would shrink from notification, for much the same reason as they were now reluctant to have anything to do with mental cases.

Sir WILLIAM WILLCOX said the question of notification was very difficult, and he did not think it was likely to come into force in this country. The doctor who notified was in an unfortunate position; he was liable to legal action and much expense and anxiety therefrom. "Once notified, always notified"; it would be a life sentence, and the patient would be looked upon as a sort of social leper.

The PRESIDENT said he did not believe Parliament would sanction notification, which would be objectionable from many points of view. Recently the Corporation of Edinburgh had brought in a Bill providing for the compulsory treatment of syphilis, and for such a Bill something could be said. But notification was a different matter.

Reply.

Dr. KNYVETT GORDON reminded Dr. McCann that the gist of his paper was not that the pathologist was the only person who could diagnose gonorrhœa, but that he could not be sure of diagnosing it. He had full sympathy with Dr. Fairfield's remarks. In the material sent him from young girls he found the gonococcus in 80 per cent. He did not agree with the principle that if there were three successive negative reports in a case, it could be regarded as cured. In such cases one could with confidence fall back on the physicians. An expert in the use of the urethroscope would probably be correct in 95 per cent. of cases. Dr. Gordon was personally against compulsory notification of venereal diseases, but it was a duty to impress on the public the seriousness of these maladies. He held that prophylaxis should not only be possible, but should be preached.

A CHILDE OPERATING THEATRE AT PORTSMOUTH.—A third operating theatre, named after the late Mr. C. P. Childe, a former honorary surgeon, has been opened at the Royal Portsmouth Hospital by his widow. It forms the first part of the contemplated extensions.

Reviews and Notices of Books.

OTO-RHINO-LARYNGOLOGY.

Tonsil Surgery. Based on a Study of the Anatomy. By ROBERT H. FOWLER, M.D., Chief Surgeon to the Tonsil Hospital, New York. Philadelphia: F. A. Davis Company. 1930. Pp. 288. 810.

THE first part of this book is largely concerned with the anatomy of the faucial tonsils, and is accompanied by some excellent plates illustrating dissections of the tonsil and the adjacent structures. These anatomical studies are associated with the investigations of Dr. T. Wingate Todd and the dissections of Mr. Harry Beecher; the principal point which emerges from them is that the deep surface of the tonsil is crossed below its centre by a transverse groove into which is inserted fibres of the palato-pharyngeus muscle, called by the author the tonsillo-pharyngeus. This muscular attachment, which has been observed by others and has been variously described as part of the superior constrictor or a "triangular ligament," is, in the opinion of Dr. Fowler, of great importance; he lays great stress on the teaching that these fibres must not be removed with the tonsil in any form of tonsillectomy. A large portion of the book is occupied by full and well-illustrated descriptions of no less than seven methods of tonsillectomy by dissection, some of them differing from others only in small details. Dr. Fowler himself uses a slow, careful, and delicate method, taking great care to remove no muscle-fibres with the tonsil, and he insists on complete rest for five days before operation. The modern guillotine operation is described as being performed in two ways—by dislocating the tonsil either against the angle of the jaw or with the finger; both methods are given as Sluder's, though the former only is properly his. Whillis and Pybus, who first introduced the latter method in this country, are not mentioned. In the discussion of the relative advantages of local and general anæsthesia the conclusion is that the choice depends largely on the training of the surgeon, but that it is better to operate on children under general anæsthesia. No reference is made to diathermy or other methods of treatment, and the book can hardly claim to be a complete treatise on the surgery of the tonsil, for the author does not discuss the treatment of malignant disease nor, except for a brief account of the opening of peritonsillar abscess, any operation except the usual tonsillectomy. A short chapter on evolution quotes largely from the work of Mr. Seccombe Hett and Dr. H. G. Butterfield. The clinical aspect of the subject is dealt with in a rather cursory fashion, and the indications for operation are described too briefly. The results of operation are more fully discussed; the author has found strikingly good results in the treatment of rheumatism both in children and in adults, but does not differentiate between the forms of disease included under rheumatism. The book is beautifully produced and the colour plates are excellent.

Nasal Catarrh. By W. STUART-LOW, F.R.C.S. Eng., Consulting Surgeon to the Central London Throat, Nose, and Ear Hospital. London: H. K. Lewis and Co., Ltd. 1930. Pp. 84. 5*s*.

THE term "nasal catarrh" includes a multitude of diseases, and the author of this little book has used the title in a popular sense to cover an exposition of his views on a variety of diseases of the nose. He holds strong opinions and expresses them with vigour; indeed, the writing suffers somewhat from over-emphasis. The object of the book is to show that nasal catarrh, whether acute or chronic, originates entirely in obstruction to a free nasal passage, and that the removal of such obstruction is of the most urgent importance in its treatment. Although it is generally acknowledged that obstruction plays a

large part in the causation of chronic catarrh, we hardly think that Mr. Stuart-Low will have succeeded in justifying the use of the word "entirely" in this connexion, or that the dictum should be applied to acute catarrh. Exception must also be taken to the statement that, in all cases of hay-fever, the nasal interior has been ready for the paroxysm, owing to the lining membrane being chronically congested from the presence of some disturbance of its interior anatomy, such as enlargements, deviations, spurs, polypi, or adhesions. The utmost that the author admits is that some patients are especially liable to nasal catarrh when grass-pollen dust is about, but he does not even mention the general specific susceptibility of such patients as shown by their cutaneous reactions. He does not believe in the treatment of nasal catarrh by vaccines, but is "more in favour of the generation of nascently produced antibodies generated at the immediate site of the inflammatory septic trouble by means of galvano-cautery applied to the roots of nasal polypi, granulations, and œdematous sites;" but he adduces no evidence that such treatment does in fact lead to the production of antibodies, and elsewhere he says that "it is reprehensible to apply the galvano-cautery to the middle turbinal region with risk of olfaction being impaired or lost, or fatal meningitis ensuing." On the other hand, Mr. Stuart-Low deserves all credit for his insistence on the importance of conserving the mucous membrane in intra-nasal operations. It is unfortunate that the book contains too many unsupported statements to be given whole-hearted acceptance by the specialty.

CLINICAL ASPECTS OF VENOUS PRESSURE.

By J. A. E. EYSTER, B.Sc., M.D., Professor of Physiology, University of Wisconsin; Associate Physician, Wisconsin General Hospital. London: Macmillan and Co., Ltd. 1929. Pp. 135. 10*s.* 6*d.*

Prof. Eyster's name is associated with numerous researches on cardiovascular subjects. In this volume he considers the application to clinical medicine of physiological observations on venous pressure, and gives a full bibliography of the more important papers on the subject. Venous pressure may be measured directly by the introduction of a cannula into one of the superficial veins; this method is obviously not applicable at the bedside, where repeated observations are required, for, as the writer observes, it is the trend of variation in pressure, rather than the absolute value, which is of importance in prognosis. The indirect method of estimating venous pressure by determining the applied pressure necessary to produce collapse of a superficial vein in the hand or forearm is fully described. This gives results which are quite equal in accuracy to the direct method and can be applied at the bedside without any inconvenience or discomfort to the patient. In health the venous pressure, with the body at rest in the recumbent posture, is maintained in the neighbourhood of from 40 to 60 mm. of water, variations in venous inflow being compensated for by corresponding variations in the ventricular output. When, however, the heart begins to fail and is no longer able to cope with the venous inflow, the venous pressure rises rapidly to 200 mm., or even higher. This rise, according to Prof. Eyster, precedes the other signs of venous congestion, for which indeed it is directly responsible, and is therefore of importance in diagnosis as well as in following the progress of the case under treatment. A series of case-histories is given to illustrate this point. The highest readings (400–500 mm. of water) are recorded in the Valsalva experiment, which is not merely of academic interest, since it is analogous to the straining at stool and other sudden violent physical efforts which may lead to heart failure. By attracting attention to a simple clinical test, which is rarely employed and may be of considerable value, the author of this book has rendered a useful service.

J. GEORGE ADAMI.

A Memoir by MARIE ADAMI. London: Constable and Co. 1930. Pp. 179. 10*s.* 6*d.*

THIS is a brief but replete account of the life of a man of many activities. The book is necessarily uncritical, being compiled and largely written by Prof. Adami's widow, but it nowhere errs on the side of fulsome or indiscriminate praise. The memoir takes us through Adami's successful academic career at Cambridge, and his long experience as professor of pathology at McGill University, notes his brief sojourn in London with high responsibility during the war, and closes with an account of his seven years of active work as vice-chancellor of the University of Liverpool.

Adami knew many members of the medical profession, while every English-speaking pathologist is familiar with his writings, so that this pious memoir will be recalling to many of our readers circumstances which are quite familiar to them. But Prof. Warthin of Michigan points out one thing that may not be generally realised, though it is very true. Adami left a deeper impression, upon the evolution of the philosophy of pathology than he did practically upon its clinical uses and applications. At Montreal he was especially interested, as Sir Humphry Rolleston, an intimate friend, points out in a brief introduction, in bringing his subject into close relation with other branches of science, and this he was specially qualified to do from a long training in scientific biology at Cambridge. And to read a list of his publications, which was steadily added to for over 40 years, is to see how often Adami's views, even if only temporarily useful as supplying working conventions, proved none the less prophetic of the truth.

Mrs. Adami has done well to publish this short history of Adami's activities, and has been fortunate in securing the collaboration of a group of his distinguished friends.

JOURNALS.

LEPROSY REVIEW.[1] Vol. I., No. 2, April, 1930.—H. W. Wade points out that the failure attending isolation in a single colony on the Island of Culion in the Philippines was due partly to inadequate diet with resulting beri-beri, and partly to its being filled early in the century with none but hopelessly afflicted lepers. A new era began in 1921, when the public began to realise that lepers were really being discharged cured. Then, for the first time, early cases began to present themselves voluntarily, and now several hundreds come in annually. H. P. Lie reviews leprosy in Norway, and has constructed an interesting graph showing a progressive decline in its incidence since 1856. Leprosy on the Gold Coast is dealt with by M. B. D. Dixey; in many parts there appears to be an utter indifference to the disease, which is regarded as resulting from some malign supernatural influence. In over 80 per cent. of the leper colony the disease is of the anæsthetic type. Treatment consists in injections of alepol, the external application of trichloracetic acid, and the use of potassium iodide. Although the number discharged as bacteriologically negative has proved small, many cases are greatly improved, and the course of the disease is often arrested. M. Wardmann and E. Landemann conclude that alepol is superior to sodium gynocardate, and N. Pavloff advocates the use of 5 per cent. solution of chromic acid for ulcerative lesions of the mouth and nose. Tetrodotoxin, "prepared from the poisonous extract of the globe fish," is said to benefit some cases of leprosy neuritis, and I. Kerr reports that the sedimentation test is proving of value in controlling the duration of leprosy treatment.

[1] Published quarterly by the British Empire Leprosy Relief Association, 29, Dorset-square, London, N.W. 1. 2*s.*

THE LANCET.

LONDON: SATURDAY, MAY 3, 1930.

THE CRISIS IN HEALTH INSURANCE.

THE report of the Government actuary on the sickness and disablement experience of a group of approved societies, summarised on pp. 981–3, has revealed a disquieting situation. The figures published indicate a steady growth in the number of persons claiming sickness benefit, the increase being most pronounced in the claims of short duration. As a consequence it is probable that the funds of many societies will show a deficit at the quinquennial valuation recently completed; not only may there be no surplus out of which to pay additional benefits but even the present rate of benefits may have to be reduced. Sir KINGSLEY WOOD in the House of Commons on Tuesday emphasised the gravity of the situation, which Mr. GREENWOOD proposed to meet by extending the field of inquiry and submitting the result to the consultative council of approved societies.

What are the causes of this disquieting change in the position of National Health Insurance? That it cannot be attributed to any one factor is certain; to discover its origins the whole field of insurance administration must be reviewed. In the first place the financial framework of the Insurance Act may need reconsideration. Based as it was on the sickness of the Manchester Unity of Oddfellows for the years 1893–97, this experience may not be applicable to such a universal system as the present. The participation of great industrial concerns with a system of administration widely different from that of the old friendly societies may account for some of the deterioration. Through them many wholly bad lives, which would have been refused under former conditions, have been State-insured. Sir ALFRED WATSON assumes that since National Health Insurance was applied compulsorily to those who were in employment on July 15th, 1912, or who entered employment later, the insured population at the outset included no persons who were already disabled; but it is admitted that many bad lives and many cripples were actually included at the outset because, in spite of their disability, they were really in employment of one sort or another. It will be remembered that a special fund, administered by the Post Office, was formed to deal with the cases refused by the approved societies, but so few were in fact refused that deposit contributors were recruited mainly from those who had not troubled to apply to any society for admission. Secondly, it is all too evident that approved societies are not in close enough touch with their membership. There is room for closer cöperation between societies, as well as for improvement in their sick visitation and in their insistence on the rules governing the conduct of members. In the current number of the *National Insurance Gazette* approved societies are urged to "do something themselves." "A person who gets a week's sick pay from an approved society to which he is not entitled needs no sympathy. He needs checking. The best check is punishment." This is the first time we have seen it admitted that approved societies have it in their power to control their members. The societies would do well to turn their attention to the system of payment through the medium of agents. In their anxiety to keep in favour with insured persons these local canvassers interpret the rights of the members in a way that must lead to inordinate demands. Coercive pressure put on insurance practitioners is largely due to the advice of these agents, who leave to the medical practitioner the task of explaining the conditions under which sickness claims can be accepted. The ugly rôle of detecting the malingerer devolves entirely on him.

In determining the growth of sickness claims, by far the largest factor is this attitude of the insured persons, which has undergone a change for the worse in the last few years. It is no exaggeration to say that they are out to get all they can in the way of benefits. The atmosphere has changed and many expect "assistance" in one form or another. Sir ALFRED WATSON shows that there are numbers of insured persons who, finding themselves out of unemployment benefit, apply for sickness benefit, and after running through both of these apply again for full sickness benefit, immediately on completion of the waiting period which must elapse before they are entitled to it. Are these people incapable of work within the meaning of the Act? Interpretation of this phrase is not easy and standards must vary. Many insured persons have a low threshold of health; when in full work they are below par, and in comparison with the healthy some degree of incapacity can always be found. But sickness claims cannot be based on vital statistics, and it would be impossible to restrict sickness benefit to those who have definite diseases. The industrial depression through which the country is passing must have its effect in lowering the vitality of the workers; bad housing and environment contribute their quota. Difficult as the practitioner's duty already is to decide which of his patients are legally entitled to sickness benefit and the necessary certificates, it is made ten times more difficult by the threatening attitude of insured persons whose claims are withstood. When at the request of the approved societies the regulation governing change of doctor was altered, so that insured persons could select another practitioner at once without any consent being required, a powerful weapon was put into the hands of the insured. The practitioner who takes a firm stand finds that he loses the insured person by transfer to another practitioner. The panel practitioner, although primarily a doctor, has become largely responsible for the correct administration of sickness benefit. He is now called upon, as Dr. G. L. MCCULLOCH very ably points out,[1] for a high standard of judicial ability in making decisions. And when his patient leaves him the reason for transfer is more often connected with certification than with treatment. The Government has now stated its intention to reconsider the interval during which the patient can change his panel doctor.

Insurance practitioners have a right to expect more support from approved societies in their difficult task. If the Act is to achieve its object the growth in sickness claims must be thoroughly investigated. The immediate problem is to examine the claims of short duration. The waiting period of three days was intended to provide the necessary delay in certain cases in order to see whether actual incapacity developed. Examination of these cases when the first certificates are given will determine whether a reasonable standard in deciding incapacity is being applied. This is essential, for if the present volume

[1] Brit. Med. Jour., April 26th, Suppl., p. 199.

of sickness benefit continues unabated the proper development of the insurance scheme will be arrested. Insurance practitioners as a body can be trusted to coöperate in applying any remedy which can be found to eliminate the so-called "improper" claims. This will involve the maintenance of an agreed standard in judging of incapacity and the resistance to all and every urge to lower that standard. Each member of the insurance service should be able to count on the loyal backing of his colleagues and on their refusal to take advantage of him by readily accepting a disgruntled insured patient.

SURGICAL DEATHS.

THE human body frequently reacts to the strain of operative procedures in an incalculable way, so that every surgical act partakes of the nature of an experiment, and thus may differ in essentials from the performances of the chemist, engineer, or physicist, where the strengths of materials, their behaviour under stress, and their reaction to combinations of circumstances, may often be accurately estimated beforehand. Deaths are liable to occur after operations where the outlook has appeared favourable, and the reasons for these fatalities are frequently difficult to find. Yet it is literally of vital importance to assign such deaths to the right cause in order as far as possible to prevent reiteration of the tragedy, while it is due to the patient to have the real risk of any proposed operation put before him, and here is a place where the necessary information defaults. What the actual hazard is, taking into consideration a large range of procedures carried out by different operators in many clinics, can scarcely be discovered from surgical literature. Mortality figures of the most expert surgeons for such an operation as prostatectomy are quoted by text-books and sometimes by operators, but both surgeon and author should know well enough that the figures do not represent the true mortality of the operation, as carried out by a surgeon of average ability who perhaps has not a clinic organised for this special branch of work. And, as in this valuable piece of surgical interference, so in many other procedures, the influences alike of individual skill and of proper environment and opportunities must be taken into account.

An article in the current number of the *Bulletin* of the American College of Surgeons, entitled the Accrediting of Surgical Deaths, presents the situation in a clear and striking fashion, while advocating a standard method of estimating the mortality of operations which could be used in many hospitals. An investigation carried out in certain American hospitals revealed the fact that institutions differed very greatly in their classification of deaths after operation; on the one hand in some centres every death after an operation was put to the account of surgical procedure, while, at the other extreme, there were hospitals where no fatality was deemed due to surgery unless some gross accident of technique during the actual operation itself was shown to have occurred. When a patient dies from a pulmonary embolism or cardiac collapse or pneumonia during convalescence, the operating surgeon is inclined to disassociate himself from the occurrence, but can he be exculpated from the position of causal agent when the fatal complications would not have occurred had there been no surgical intervention? Yet such deaths are due not to defects in surgical skill but to gaps in our knowledge. The surgeon, though guiltless of negligence—for he has applied to the problem of the patient's disease what knowledge is available—cannot evade responsibility for the fatal outcome. Nor should the surgeon desire to do so, for any other attitude, while lulling him into complacency, would stifle research as to the causation of these unfortunate results. To gain a true perception of what is the mortality after surgical operations, speaking alike generally or with particular procedures in mind, a decision should be attempted as to what deaths are to be accredited to surgery; and the first step to such a decision will be to obtain some uniformity in the records of different hospitals, when a comparison of reports should give a truer picture of operative risks than we have yet been able to envisage.

Dr. E. L. HUNT, the writer of the paper in the *Bulletin* referred to above, outlines a system by which some such collated information might be made available. The proposed records would comprise a preoperative diagnosis; a preoperative estimation of the surgical risk—including the method of evaluation employed; evidence obtained at operation and post-operative developments; a secondary evaluation of the condition of patient, when the primary appraisement has been proved to be wrong; and autopsy findings. The difficulties of the system are evident, for it would reveal defects in the practice of certain hospitals and indeed of certain operators; these form essentials preliminary to progress and the betterment of results. The final assessments would have to be made by some other persons than the operators. If the system were carried out in a clear, impersonal, and scientific manner, the surgeon should not feel that his personal integrity was assailed, and indeed should welcome such scrutiny of his work; but not all men take up this brave attitude under criticism, and while hasty or incompetent surgery would be revealed at its proper value there would be often room for the argument that haste had been employed in the interests of the patient, and had given rise to the appearance of incompetency. The method is primarily directed to the discovery of defects, for only after technical errors are exposed to the light of day can remedial measures be set in motion. Accepted in the right spirit there might result a general improvement in the standard of work done under the influence of greater surgical wisdom. A perception of operative risks in the hands of the surgeon of average ability would be revealed, whilst the assessment of individual surgical skill would be facilitated. No system ever devised can be without its drawbacks, and this is no exception, for there lurks the possible danger that surgical enterprise and research might suffer a check, when an intensive inspection of results was known to follow operative work. Partial gastrectomy for gastric ulcer, compared with gastro-enterostomy upon its introduction, was accompanied by a high mortality, yet it has proved in the end to be much more effective and scarcely at all more dangerous. Thyroidectomy for Graves's disease has passed through a stage of disheartening mortality to one where the risk is often measurably smaller than that of leaving the unfortunate patient to his fate. In both cases enterprise was ill rewarded at the outset. Will the surgeon whose reputation is assessed by the working of any such scheme be anxious to tread unknown fields? Safeguards would have to be devised to protect the legitimate investigator of new surgical methods. But if this were effectively brought about, it is difficult to see any objection to the institution of such a uniform investigation of deaths following operations as our American colleague suggests.

A NATIONAL MEDICAL SERVICE.

As an appendix to the annual report of the Council for the year 1929–30, the British Medical Association has issued proposals for "A General Medical Service for the Nation," and these were printed in the *British Medical Journal* of April 26th. They are fundamental. The service postulated is complete, and is considered under the heading of prevention and treatment. The professional position of the family doctor, the consultant, and the specialist being analysed, the foundation of any efficient system is declared to be the family doctor; and, accordingly, it is stated as implicit in any sound scheme for a national medical service that every individual in the community must be in a definite relation with a general practitioner. This is the existing position as far as the 15,000,000 of insured persons are in question, and the way in which panel practice can be extended to include dependents is laid down, though it is nowhere, apparently, stated what the exact range of population is for whom the benefits of the scheme are intended; granted that a contributory plan for securing medical service is better for some, is it to be assumed that it is best for all? Where, how, and for whom institutional treatment should be provided forms an important section of the document, and here the rôles of the voluntary and Council hospital—this is the name suggested for the transformed poor-law institution—are defined, and the difficulties in adjusting their common claims upon the assistance of their staffs are mentioned as matters requiring further attention. The creation of "Home Hospitals" is advocated, the institutions, whether separate units or annexes to existing hospitals, being for the use of those persons, not fit subjects for free or practically free treatment, who are still unable to pay the charges of private establishments. In the "Home Hospitals" the coöperation of general practitioners in institutional work would receive full play.

It is of great value to the country that the broad views of the British Medical Association upon the problems of national health should receive popular declaration. Close attention on the part of the Association has interpreted the messages of numerous reports from public bodies, of many schemes for medical benefit on special lines, and of many experiences that institutions of all sorts could relate. And the proposals of the Association, in piecing all this together, have been now submitted to the public as a coherent and inclusive scheme of medical service based on simple concrete principles. More is not attempted, while the fullest criticism of what has been done is implied by the comparison of the scheme to a plan submitted by an architect to a householder, who may decide that the specifications for construction, for extension, or for improvement so nearly meet what is wanted that the money must be found, or, on the other hand, may find the cost too high, and either decline to proceed or suggest modifications of a more modest sort. For the scope of the Association's proposals is enormous, being no less than to ensure that "every kind of service which may be necessary for the prevention and cure of disease and for the promotion of full mental and physical efficiency . . . should be at the disposal of every member of the community." In respect of prevention, the coöperation of the public is insisted upon; the duty of the individual to provide a healthy environment in his home and so to live as to promote the health of himself and family being the first step. The next is the right use of the family doctor, who, by educating the individual and the family in the course of his curative and advisory work in the home and in his consulting room, can confirm his patients in their good conduct. Schools, by the education of the children in matters of health, and the public health authorities and voluntary agencies by the dissemination of information and counsel, should enable the public to appreciate the aims of organised sanitation, and stimulate them to play a helpful part, as occasion arises. The proposals of the Association under the head of prevention are here based upon the reiterated publications of the Ministry of Health and the emphatic essays of Sir GEORGE NEWMAN, but under the head of treatment the proposals have been inspired, it may be guessed, by some apprehension that the bureau may come to be unduly predominant. The claim that every individual should have a call upon a family doctor is a direct warning to the public that only by the observer who is in intimate and domestic touch with the sick can any certainty be obtained as to many of the circumstances of an illness. With the general practitioner becoming yearly, almost daily, better equipped, it seems curious that his position should require so much insisting upon, and yet it has been observed that many of the developments not only in public health but in therapeutics generally have been at the expense of the earning powers of the general practitioner. It will be remembered that last year the Council of the B.M.A. reported on the encroachment upon the sphere of private practice through the activities of local authorities and voluntary agencies, and the proposals of the Association at this place form, again, a recognition that the family doctor must be the foundation of any complete and efficient medical service. His life work is the sub-structure on which all forms of medical service can be built, and it is a proof of the partial nature of the public comprehension of scientific medicine that the general practitioner should find limits being set to his opportunities when he has never been better able to take advantage of them and develop them. That the public should turn to him not only in his personal capacity, but as a medium for obtaining the best advice from consultants and specialists, would seem obvious. Auxiliary forms of diagnosis and treatment should be available for all, but the public can only obtain these with any safety through the agency of the family doctor.

Those who find the proposals of the British Medical Association to be merely voicing oft stated and generally accepted sentiments may be reminded that the scheme of the Association is being laid before the public, and not before doctors only. We make no attempt to give in any sense a full résumé of this important document; it is a notable example of brevity when the range of subjects is regarded for which some 15 pages have been found sufficient, and any attempt at ordered curtailment would eventuate in little but a meaningless index of contents. The propounders of the scheme believe that, if put into operation, it would lead to complete coördination of the whole medical service for the community, while it will be gathered that the central figure in the coördination is the general practitioner. It is shown how he can be brought into relation with every institution and service in his area, could relegate his patients for treatment in accordance with their needs to places whose merits he could evaluate, while he would be in touch with the medical officers for school purposes and with organisations for maternity and child welfare, instead of being not infrequently

without the advantages of such contacts. Further, while hospitals are to take their proper place in general medical organisation, much of the time and money wasted in out-patients departments would be saved through the general practitioner's efforts, while he in his turn, especially through the Home Hospitals, would be able to turn institutional experience to the advantage of his patients and himself. The legislation required for such ends would take the form mainly of amendments to the National Health Insurance Acts, and is of the sort that can be readily justified to voters, but the financial side of the scheme is less promising. This matter is not closely dealt with in the proposals, as it is realised that before they can become practical politics their financial aspects must receive expert attention.

Annotations.

"Ne quid nimis."

IN MEMORY OF HARVEY.

LAST year, during the celebrations by the Royal College of Physicians of London of the tercentenary of the publication of De Motu Cordis, Sir John Rose Bradford published an appeal to the medical profession, intended also for the information of the public, in respect of the condition of the tower of Hempstead Church. William Harvey was buried in this church, and the tower collapsed some 50 years ago and has never been replaced. A strong committee was formed last year having for its object the raising of sufficient money to re-erect the tower of Hempstead Church as a memorial to Harvey. The sum of £5700 is estimated to be necessary for the work projected, of which £1500—and probably a little more—have been received, leaving the balance of £4000 to be obtained through the generosity of subscribers, individual or corporate. The appeal was primarily to the medical profession and has resulted so far in this creditable response, to which the great medical institutions have contributed as well as Caius College, Cambridge, where Harvey received his education, and Merton College, Oxford, where later he was warden. Harvey is among the greatest of Englishmen, and the memorial thus suggested is out of all comparison small when set beside his achievement, for all mankind has benefited to an incalculable degree from work which provided a new and true foundation for physiology. So that the small sum needed to erect a material monument to his fame ought to be forthcoming promptly. Donations should be made payable to the Harvey Memorial Fund and sent to the hon. treasurer, Mr. A. W. Ruggles-Brise, Spain's Hall, Braintree, or to Dr. Arnold Stott, 58, Harley-street, W.1, joint hon. secretary with the vicar of Hempstead.

RADIUM IN THE TREATMENT OF INTRA-OCULAR TUMOURS.

IN the April number of the *British Journal of Ophthalmology* we read of what we take to be the first case of sarcoma of the choroid cured by the insertion of radon seeds. The patient was a man aged 65 with a large typical sarcoma of the choroid, who was first seen at Moorfields by Mr. W. S. Duke-Elder. As the unaffected eye was blind the patient not unnaturally refused to have his only seeing eye excised—hitherto the only treatment found effective in preventing the spread or dissemination of a malignant tumour of the retina or choroid. The case was, therefore, suitable for experimental treatment by radium, and was transferred to the care of Mr. Foster Moore at St. Bartholomew's Hospital for the purpose. At first a radon seed of 1 millicurie strength, filtered through 0·5 mm. of platinum, was introduced through a minute incision in the sclera, and left embedded in the tumour for 14 days, after which it was removed by the same route through which it had entered. No very obvious change in the condition of the eye followed, and about four months later a second seed was inserted, this time of a strength of 5 millicuries, with the same filter as before. Less than three months afterwards it was clear to all observers that the growth was shrinking. Five months later still (February, 1930) Mr. Duke-Elder reported that the mass had shrunk to about one-quarter of its size when he had last seen it a year ago. The residue, he thinks, is merely fibrous tissue. Mr. Foster Moore's comment on the case is that the point of paramount importance is the fear of dissemination. When the growth begins to shrink are we justified in assuming that the danger of dissemination has ceased? It seems unlikely, he says, that actively growing cells will be thrown off from a tumour which has begun to regress. If so, the eye no longer remains a menace to the patient, and he is as much protected against dissemination (no more and no less) as if he had had it removed. If, he goes on, we are prepared to accept this view, it seems reasonable to treat any case of accessible intra-ocular sarcoma by the foregoing means when the growth has not as yet seriously spoiled the eye, and in the rare cases when the growth occurs in an only eye, or the only useful eye, it appears to be the proper treatment.

Mr. Foster Moore has adopted the same treatment for glioma, in the case of a boy of 4 years old, one of whose eyes had already been excised two years previously for the same condition. In this case the strength of the radon seed was 3 millicuries, and it was left in the tumour for ten days. As the date of this insertion was only last November, it is too soon to be certain of a complete cure, but the growth had very largely disappeared when he reported[1] it to the Royal Society of Medicine.

EARLY MORNING IN HOSPITAL.

THE rearrangement of the ward work at the Middlesex Hospital in order to avoid disturbing patients before 7 A.M. has stimulated other authorities to consider whether these adjustments are worth making. The Central Bureau of Hospital Information, established under the auspices of the British Hospitals Association and the Joint Council of the Order of St. John and the British Red Cross Society, has received replies from 63 provincial hospitals to a questionnaire on the subject. The accommodation in these hospitals varies from under 100 to over 1000 in-patients, and the wards contain from 13 to 40 beds; each ward needs a day staff of from 3 to 11 and a night staff which in no hospital exceeds two, supplemented in eight hospitals by "runners" to take urgent messages. The information provided includes also the times at which day and night staffs come on and off duty, at which work commences in the wards, and at which breakfast is served to patients and nurses. The hour at which wards are ready for visiting by the resident medical staff is also stated and the hour of attendance by the honorary medical staff, with the earliest operation hour in routine work. The Bureau also asked each hospital to estimate the additional staff required to avoid disturbance of patients before 7 A.M., and to give an opinion on the wisdom of such a change. An examination of the figures supplied shows that the day nurses mostly come on duty at 7 A.M. and the night nurses go off duty between 8 and 8.30 A.M., overlapping with the day staff in the morning for one hour to an hour and a half. In three hospitals (Nos. 9, 14, and 63) there is no overlapping in the morning. In 45 hospitals work begins in the wards before 6 A.M., and in 18 at 6 A.M. or later. The

[1] Proc. of Roy. Soc. Med., February, 1930, p. 475.

interval between the beginning of work and breakfast varies from 0 to 2½ hours, the majority of hospitals allowing from 30 to 60 minutes. The interval between the beginning of work in a ward and the morning visits of the honorary medical staff varies from 3 to 6½ hours. With regard to the extra staff required for a postponement of morning activities, the various opinions expressed reflect the difficulty involved in estimating the effect on staff whenever a load factor is increased sharply and for a limited period. Some hospitals protest that the present staff might have to be doubled; others confess that the increase would be difficult to estimate; six announce that no additional staff would be required. The comments are interesting. Roughly half the hospitals consulted point out various difficulties and express doubts whether a later time for opening the wards is practicable or even desirable. About one-third of the hospitals praise the scheme and have either adopted it or are considering its adoption. About one-sixth of the hospitals believe that later rousing is unnecessary or inadvisable, some giving no reason and others saying that patients are used to early rising, may be awake and hungry, and are anyhow likely to need attention before 7 A.M. Moreover—and this is the most crucial argument against a change of organisation involving more staff—the patients in wards which close down, say, at 8 P.M. and open at 6 A.M., get the opportunity for ten hours of undisturbed sleep. No information was apparently asked for—at any rate none is given—about the hour when lights are put out in the various hospitals. Hospital No. 33 suggests that so long as patients get the proper amount of sleep the actual hour of waking is not of great importance. Most people will agree with this dictum, with the important reservation that patients recently admitted to hospital or at home after discharge are not likely to get a good night's sleep if the day's routine at hospital is in sharp contrast with that of home life. Few adults habitually go to bed at 8 P.M., and during the first two hours of the hospital night many patients remain restlessly awake, especially in the summer. Probably the best solution for those hospitals whose wards open at 6 A.M. would be one which could be adopted with no alteration except a psychological adjustment and one to which the Daylight Saving Bill has already accustomed us. Assuming that a ward which is now ready for the doctor at 9 A.M. was allowed to remain closed till 10 A.M., the whole hospital routine could be shifted forward by one hour and no one, except perhaps the house surgeons and students, would suffer. The patient's day would be more like his normal one, the nurses' evening off-duty times would extend to a more convenient hour, and the change would cost nothing.

TESTICULAR GRAFTS.

THE controversy about the experiments of Voronoff has been based on very few facts, and it has been hard to get independent and reliable testimony. The results obtained by Dr. E. Schleyer[1] are, therefore, of interest. He has operated on nine patients, eight of whom ranged in age from 49 to 76, the exception being a eunuchoid of 37, who insisted on undergoing the operation against advice, and who did not benefit. In five of the eight Schleyer claims to have produced appreciable rejuvenation lasting for one to two years. The method was Voronoff's own—namely, transplantation of two slips of ape's testicle into the tunica vaginalis on each side. Schleyer never performed a test excision of the graft in any of these cases, but relied on the somewhat crude method of palpation to inform him of its fate. After nine months the slips were no longer palpable, although the effect continued. He does not agree with Voronoff that the grafts become vascularised and incorporated with the testicle of the host. The effect on the host is, he thinks, due to two or three causes. The hormones produced by the graft or set free when it is absorbed stimulate the testicle to a greater hormone production, and he thinks it probable that the protein substances of the graft stimulate the other glands of internal secretion. The operation can be repeated. Success, he thinks, depends upon a correct choice of patient and on early treatment. There seems no reason to doubt that under certain circumstances testicular grafts will mitigate or remove for a time some of the symptoms of age, but it seems to be fairly well established that Voronoff's method is at best only an administration of foreign testicular substance, and not in any sense a transplantation of a living organism.

[1] Münch. med. Woch., April 18th, p. 664.

HIGH PROTEIN DIETS AND RENAL INJURY.

CLINICAL experience has in the past led observers to regard large amounts of muscle protein as distinctly inadvisable for people suffering from renal diseases, and it has been thought that excessive consumption of meat may be capable of actually provoking renal lesions in man. A great many experiments have been done on animals in recent years to determine precisely the histological and functional effects of consuming abnormally high proportions of protein. The results have been conflicting, for, as might be expected, different species of animals respond to such diets in different ways, and varying renal responses follow the giving of different kinds of protein. Controlled experiments with man himself as the test animal have not been frequent. It may be remembered that a little while ago the Arctic explorer Stefansson and his colleague Andersen subjected themselves for a year to an exclusively meat diet, and that this was found to have had no demonstrably injurious effects on their kidneys.[1] It was pointed out at the time that their actual consumption of protein was not especially high, so that the experiment did not settle the question as to the effect on man's kidneys of excessive amounts of meat protein. Prof. Newburgh,[2] who has been engaged for some years in investigating the toxic effects of high protein diets on animals, has recently reported, in conjunction with some of his colleagues, an experiment on similar lines carried out with a man. For six months their subject, a man of 32 apparently in perfect health, lived on a diet containing a daily allowance of 337 g. of protein. The bulk of his food consisted of fresh beefsteak, veal, and beef liver. The meat was supplemented by green vegetables, butter, and citrus fruits. No subjective disturbances of any kind were noted during the six months and the subject's blood pressure remained unaltered throughout the period. Six weeks after the beginning of the test a slight cloud of albumin was noticed in the urine, and the amount steadily increased till at the end of the sixth month 2 to 4 mg. was being excreted each hour. Ten days after the completion of the experiment and the resumption of a normal diet the albumin had completely disappeared. Perhaps of more significance than the slight degree of albuminuria provoked by the diet was the appearance of increasing numbers of casts in the urine. After two months there was an average excretion of about 1000 casts per hour, and at the end of six months the number was approximately doubled. In the early stages of the experiment the casts were hyaline, later more and more of them were of the granular variety, and towards the end cellular casts were met with. They had completely disappeared from the urine ten days after a normal diet had been resumed. The evidence collected in this single experiment certainly lends support to the view that excessive amounts of meat protein can damage the kidneys in man. Whether considerably smaller amounts taken for a much longer time might have a similar effect cannot be presumed without experimental proof; there is certainly at present no convincing evidence

[1] See THE LANCET, 1929, ii., 238.

[2] Newburgh, L. H., Falcon-Lesses, M., and Johnston, M. W.: Amer. Jour. Med. Sci., 1930, clxxix., 305.

in favour of the view that the amount of meat protein ordinarily consumed by the Western races of mankind can itself initiate renal disease.

A NEW PRINCIPLE FOR AIDS TO HEARING.

THE act of hearing is accomplished by the vibration of end-organs in the cochlea induced by sound-waves which penetrate to the internal ear, and our present methods of assisting hearing involve various forms of apparatus designed to increase the energy of these sound-waves and to conduct them to the cochlea through the middle ear or through the cranial bones. In the telephone, and in electric hearing aids, the sound-waves of speech cause vibrations in a microphone; these vibrations produce modulations of an electric current which, in turn, cause identical vibrations in the microphone of the receiver, and thus reconvert the electric current into waves of sound. It has occurred to Prof. S. Jellinek and T. Scheiber, of Vienna, that the perception of hearing might be accomplished by conducting the modulated electric current directly to the cochlea without first reconverting it into sound-waves. In a preliminary communication [1] they say that they are now able to conduct such a current to the ear and by this means to hear and to differentiate speech, music, and other sounds, and that this hearing is unaffected by plugging the auditory canal. They give no description of the apparatus by which their results have been obtained, and a further communication will be awaited with interest, for the method may prove to be valuable if clear perception of sound can be produced by it in a convenient and practical manner.

RICKETS IN EGYPT.

IN European countries it is generally supposed that rickets is a disease of northern climates where sunlight is deficient. Tropical or sub-tropical countries are believed to be happily free from rickets, as witness the statement of one authority that "in Egypt, India, and China, where infants are brought up in the open air, and where they are bathed in daily sunshine from their birth onwards, no errors in food will produce the disease." How far this statement differs from the truth was pointed out by Dr. I. Shawki, in an address to the International Congress of Medicine and Hygiene, which has now been printed.[2] Of 500 children between the ages of six months and two years, who attended the out-patient department of the Kasr-el-Eine Hospital, 45 per cent. showed bony manifestations of rickets and among 100 apparently healthy children, 23 per cent. showed evidence of rickets on radiographic examination. The causes of these high figures, Dr. Shawki pointed out, cannot be those usually assigned to the production of rickets—namely, absence of sunshine and artificial feeding. Egyptian sunshine fails for perhaps a fortnight in the year, and breast-feeding of infants is the rule, not the exception. There is some evidence that the ultra-violet rays are less powerful in flat low-lying countries, but even so they are probably considerably stronger in Egypt than in countries north of the Mediterranean, though dust may absorb a certain amount of the rays. There is, however, another reason, and one which Dr. Shawki did not mention. The fact is that the Egyptian infant is scarcely ever exposed to the sun. If the poorer class Egyptian mother is asked to undress her child she will draw up two or three thick outer garments and show a cotton or wool shirt which is bound down to the baby by a thick binder of some felt-like material, five inches wide and a yard or more in length. This is rolled round and round the child even during the hottest weather. When fully dressed the child is carried over the maternal shoulder wrapped in the folds of her black draperies. If he sees the sun at all he is fortunate, and as to playing in the open air or bathing in sunshine, his mother would consider such a suggestion madness. Dr. Shawki mentioned prolonged lactation as a common cause of rickets in Egypt; a child is usually breast-fed until he is two years old, or a girl for 18 months, as being less important. If it is remembered that the diet of the poor-class Egyptian mother is scanty, and poor in vitamins, and that other food is not considered to be necessary while a child is taking the breast, the ætiology of Egyptian rickets becomes less obscure.

Dr. Shawki made a third suggestion: frequent gastro-intestinal disturbances may interfere with the absorption of calcium and phosphorus and increase the tendency to rickets. Gastro-enteritis from various causes is, of course, extremely prevalent among Egyptian infants, and is responsible for a large proportion of the death-rate.

[1] Wien. Klin. Woch., April 3rd, p. 417.

[2] Congrès Internat. de Méd. Trop. et d'Hyg., Comptes rendus, tome ii.

PRE-SCHOOL CARE.

THE school medical report from Eccles throws some light on the needs of children aged 2–5 years. It is often stated that from a quarter to a third of school entrants are physically so defective as to be scarcely fit to receive education. Last year Dr. J. E. Spence found that the proportion in Eccles was 23 per cent.; of these, avoiding all exaggeration, in one-fifth the state was serious, in the majority being more or less transitory. Squint he does not include among the serious defects, although its preventive treatment is urgent, a fact of which Dr. Spence shows he is fully aware in his report. The point to which we would draw attention here is that a large proportion of the defects are preventable; Dr. Spence holds that nine-tenths of them could be obviated by improved nurture and environment in early childhood. How can healthy conditions of life, training in hygienic habits, medical care and treatment be brought to bear on the pre-school child? In their endeavour to answer this question the borough council of Eccles have merged the child welfare and school medical services so that children not yet of school age are supervised by health visitors, and have all the facilities of the school clinics open to them. To reduce the gap, they have encouraged the admission to school of children from 3 to 5 years, 44 per cent. of whom are now actually in attendance. But more is needed and is evidently desired. The number of younger children making use of the school clinics is as yet far too small, and the majority are still having no systematic medical care or hygienic education. The provision of nursery schools might help, but the experience in Eccles is that parents are for the most part unwilling for the 2–3 year-olds to attend school, and it is estimated that not more than 15 per cent. of them would do so, even if the provision was made. It is more necessary in the poorer and more crowded parts of a town, but on grounds of economical administration Dr. Spence would prefer to have nursery classes in existing schools, given the necessary extensions and alterations of the premises. His own observations may justly lead others to conclude that (1) the care of the pre-school child is worthy of close attention and vigorous action; (2) for the 2–3 year-olds the coöperative activities of health visitors and treatment clinics should be widely utilised; (3) for the 3–5 year-olds admission to the elementary school should be encouraged when home conditions are not good; (4) in the poorer areas, nursery classes should be held in connexion with existing schools, and where practicable nursery schools set up. Two further lines of attack not specifically mentioned in Dr. Spence's report may be suggested. (5) Parents should be advised to keep their children under the regular care of their own doctors; (6) the mothers of the next generation should be taught the principles of healthy upbringing. Ideally no doubt the wide-spread development of nursery schools is the way to deal with the problem.

THE NECESSITY OF A DEFENCE SOCIETY.

AT the annual meeting of the London and Counties Medical Protection Society Sir John Rose Bradford pointed out the absolute necessity for the existence of "protection organisations," and we may draw attention to his words, though their message is so familiar, because, speaking from a long experience, he suggested that the volume of legal work which would have to be undertaken in the interests of medical practitioners was likely to increase in the future. That is to say that, while medical practitioners seem in increasing numbers to insure against the risk of legal actions, those actions are increasing at a similar or even faster rate. From the annual report of the L.C.M.P.S.—which is not happy in its drawn-out title—it can be gathered that the cases dealt with by the Society during the past year have fallen mainly under the heading of charges brought against members of negligence or unskilfulness. Further, the liability to these charges was increased by absence of precaution on the part of the medical practitioner when, as was very generally the case, an accusation of malpraxis followed treatment for fracture. The opportunities for making these charges have multiplied, obviously in proportion to the increased opportunities for useful surgical interference which modern surgery furnishes. The public are fully aware, as is right, that radiology can often give critical information for the guidance of the surgeon in diagnosing a bone injury, and in repeated cases, where accusations of negligence have been made, had the medical practitioner insisted upon the patient having an X ray examination the charge would never have been brought. But where a dissatisfied patient consults a radiologist some time after the injury, while the doctor has not called the radiologist to his assistance at the time of the injury, the defence against a charge of negligence becomes difficult. The fact that the charge is often not a sincere one, but represents only a manœuvre to avoid payment of a legitimate bill, is beside the point—this is a hard thing to prove, as the money may be withheld out of a genuine disappointment with the treatment, while, whatever the patient's mainspring of action may be, the trouble arising will be the same. Hence in all injuries where it is possible that fractures or dislocations, or both, may have occurred, medical practitioners should secure the support of an X ray examination, and should try to persuade patients of the value of the procedure if they are unwilling to incur the expense. These warning words have been written in THE LANCET before, as they no doubt have been included in the annual reports of various defence associations for many years, but the counsel should be repeated, because this professional risk tends to become more common; and every successful claim of this sort—successful generally because the practitioner has not protected himself in advance—stimulates a certain kind of patient to make a charge of negligence as a way of getting out of paying his bill.

PSITTACOSIS AND THE IMPORTATION OF PARROTS.

THE Ministry of Health and the Department of Health for Scotland have issued orders prohibiting the importation into this country of "all birds of the parrot species" after May 19th. This step is taken for the protection of the public against psittacosis, and the regulations will not apply to parrots required for medical or veterinary research or those consigned to the zoological societies or to persons specially authorised. In the House of Commons on April 16th Miss Susan Lawrence stated that "information has been received in the Ministry of Health of 80 cases of illness which commenced during the present year and in which the patients had been associated with sick parrots." Thirteen of these cases proved fatal, and in nine of them psittacosis appeared on the death certificate as the cause of death. In stopping the importation of parrots Great Britain is following the example of most of the other countries in which the disease has appeared. A review of the subject just published by the secretariat of the League of Nations[1] describes the incidence in these countries and goes on to discuss the ætiology at length. Bacteriologists in France, Germany, and the United States have now confirmed the observations which Bedson, Western, and Levy Simpson reported in our issues of Feb. 1st and 15th, and it is generally agreed that the disease is caused by a filtrable virus. But the League of Nations reviewer is loth to abandon previous ideas, and ingeniously reconciles two schools of thought by suggesting that the virus may be a filtrable phase of a typhoid or food-poisoning organism. Indeed he goes so far as to say that it may "be admitted, until proof is furnished to the contrary, that, bacteriologically, psittacosis is caused by a filtrable virus belonging to the salmonelloses group."

HULL AND MUNICIPAL RADIUM.

THE Kingston-upon-Hull Corporation Bill, which is awaiting a third reading, contains a novel clause (42) dealing with radium supply. As the Local Legislation Committee has approved the clause in an amended form Parliament will presumably accept it. For several years, thanks to the activity of a former medical officer of health, the municipality of Hull has been building up a supply of radium which now amounts, it is understood, to 1034 milligrammes. The Corporation could, of course, utilise this valuable possession in the exercise of its poor-law functions, but it desired to make the radium available to the fullest extent. It therefore seized the opportunity arising out of the promotion of a local Bill on more general matters, and asked for special powers to "purchase or hire or enter into any agreement or arrangement for the use of radium, and supply it to any medical practitioner with or without any charge therefor." This new provision was tacked on to a clause of a not unfamiliar type under which the municipality was to be empowered to supply medical practitioners with medicines, appliances, and requisites for the care and surgical treatment of sick persons. The Local Legislation Committee inserted the following proviso to this clause as to the provision of medicine, &c., generally:—

> "Provided that the medicines, appliances, and requisites to be supplied under this section shall include only those in respect of which, when supplied by a duly qualified medical practitioner under the National Health Insurance Act, 1924, payment is made on the basis of the drug tariff for the time being in force in the city."

As to the provision of radium the Committee has converted the proposed subclause into a new clause (42A) more strictly framed. The new clause authorises the Corporation not to deal directly with the purchase, hire, &c., of radium, but to "make reasonable subscriptions or donations to any trustees or other body constituted for the purpose of holding, supplying or administering radium, and, on making any subscription or donation under this section the Corporation may impose such terms and conditions relative to the supply, administering or use of radium as they may think fit." The expenditure in this connexion is not to exceed a penny rate. The amended clause, which the Ministry of Health has presumably approved, seems wide enough for all practical purposes. The working of this bold experiment will be watched with interest.

THE STORY OF A SURGEON.[2]

Sir John Bland-Sutton tells the story of his life—or rather the notes for such a story—with the kindliness, simplicity, and learning which his writings, whether addressed to scientific or more popular

[1] Monthly Epidemiological Report, April 15th, p. 141.
[2] The Story of a Surgeon. By Sir John Bland-Sutton. London: Methuen and Co. 1930. Pp. 204. 12s. 6d.

audiences, have always exhibited. He describes his childhood with considerable detail, records his early interests in natural history, which were hereditary and which throve in a fortunate environment, and in these early chapters he draws upon his memory for multifarious incidents which determined him to become a surgeon and which compelled him to remain a naturalist. Two closely written chapters are devoted to experiences as a prosector at the Zoo, and it is when recording these events that the author explains how often passages in his book must have lain dormant in his mind for years to recur with vividness during the process of writing. It is this spontaneous character of the reminiscences, whether concerned with hospital, official or private life, with strenuous work or holiday excursions, which alike accounts for their fascination and also for the fact that no very accurate time-chart has been kept in the record of the occurrences. Many reminiscences are included of the professional leaders with whom, in the wards of the Middlesex Hospital and elsewhere, the author was brought into contact, and they are all set down with great charity; those who studied medicine round about the late 'seventies will find much to interest them in the references to Sir James Paget, Hulke, Lister, Freeman of Bath, Douglas Powell, Sir William Flower, Greenhow, Lawson Tait, Sir Patrick Manson, and others, and we are glad to see that the work of Thomas Cooke, in the last of the private anatomy schools of London, receives a word of appreciation. Sir John is the most modest of authors, and in supplying an annotated list of his writings he leaves to others all estimate of their value. Few readers would gather from the notes which he makes on "Tumours, Innocent and Malignant," that this book, written nearly forty years ago, and the first in which tumours were classified in any logical manner, proved a revelation to students in the year of its publication, and revolutionised immediately much of the pathological teaching current at the time (1893). Consecutive editions appeared until the author decided to allow the manual to remain in the form in which it was issued in 1922 as evidence of the state of clinical knowledge in regard to tumours at that date. A preamble to the volume, furnished by Mr. Rudyard Kipling, takes the shape of an encouragement to produce the volume couched in mediæval English, and addressed to the "Knight and Chirurgeon in his work and heart of Middlesex."

THE ROSS INSTITUTE.

THE annual report of the Ross Institute for 1929 indicates the directions in which research is being pursued by the staff and by voluntary workers in the several departments. Dr. J. A. Shaw-Mackenzie, Dr. Jackson Clarke, and Dr. Tertius Clarke have worked in the department of tropical hygiene, which is under the direction of Sir William Simpson. In the department of tropical medicine and dermatology Sir Aldo Castellani, the director, has continued his researches on fungi and fungal diseases, and has investigated various types of colitis; Dr. Mackenzie Douglas has worked on the effect of the growth of intestinal bacteria on carbohydrates and allied substances. The report describes in some detail the active anti-malarial work carried out under the auspicies of the Institute and its director-in-chief, Sir Ronald Ross.

The new Malaria Laboratory at the Institute is now complete and well equipped. Two planters' courses have been held there and doctors either from or proceeding to the tropics have used the laboratory to study both the entomological and practical sides of malaria control. The Industrial Anti-Malarial Advisory Committee of the Institute was inaugurated on July 13th, 1929, and the Committee has since met quarterly to consider problems relating to the economic control of the disease in tropical industries, and to promote and assist the anti-malarial work which is being done in different parts of the world. The Committee has members who represent industries in India, Ceylon, Rhodesia, Malaya, Java, Borneo, and Sumatra, and the services of others representing industries in Africa and of British interests in South America are to be enlisted. A Malaria Expedition toured India in 1928-29. Sir Malcolm Watson comments on "the number of invitations extended to the expedition which showed the great interest now taken in the prevention of malaria, and a fuller realisation of the economic loss it causes to India." In some places anti-malarial work was started during the visit of the expedition; in others arrangements were made for further preliminary scientific work. Industrial companies which have already reaped benefits through approaching the problem by the close association of science and practical work are increasingly supporting the Institute.

The Anti-Malaria Co-operative Societies of Bengal were found to be doing valuable work, and satisfactory reports have been received from the iron ore mines belonging to the Tata Iron and Steel Company of the results of anti-malarial work carried out under Mr. Senior-White. Malaria control at Noamundi mine is apparently admirable. The initial efforts made during the last few years in Assam have proved according to this report that the control of malaria on tea estates in Assam is not only possible but also economically practicable.

In Northern Rhodesia, the directors of the Roan Antelope Copper Mines and the Rhodesian Selection Trust, invited the Institute to assist them in improving the sanitation of their copper properties and in eliminating malaria. Two expeditions have been sent out, the first consisting of Sir William Simpson, Dr. A. Dalzell, and Mr. C. R. Harrison. Sir William returned after four months, and submitted a full report on general sanitary measures and housing to the directors in London. Mr. Harrison stayed for six months to make a survey and start the control work, and Dr. Dalzell will remain in Northern Rhodesia on behalf of the Ross Institute, as special scientific officer to the companies, until permanent arrangements have been completed. Sir Malcolm Watson later visited Rhodesia to inspect the anti-malarial work in progress on the mines and to investigate certain aspects of the problem. Much importance is attached by the Institute to propaganda work with regard to malaria. A paper for laymen on the prevention of malaria, first published by Dr. Cuthbert Christy in 1917, has been brought up to date, and is being issued for free distribution to residents in the tropics in a water and insect proof cover. The distribution will be made through the various Chambers of Commerce and Associations connected with tropical industries throughout the Empire and should have useful results.

THE Minister of Health has decided to restore the Chairmanship of the Welsh Board of Health, and has appointed to the post Mr. John Rowland, a member of the Board and Deputy Controller of Insurance. The Board will henceforth consist of Mr. Rowland, Dr. Llewelyn-Williams, and Mr. Howell E. James.

BOSTON CITY HOSPITAL.—A report of this hospital at Boston, Massachusetts, has now been issued for 1928 and shows that the cost per patient per day was a little over 18*s.* while at the convalescent home it was, roughly, 14*s.* 8*d.* At the hospital proper each out-patient visit cost about 2*s.* 3*d.* Over £21,000 was received from paying patients. There were 23,576 in-patients and 291,567 out-patients. During the year an "afternoon medical out-patient clinic" was opened for the benefit of patients "whose problems require more than the average amount of personal attention the patients require from physicians." The clinic is open three afternoons weekly, and the work is undertaken by three physicians, one of them resident, and three or four fourth year medical students. A new residence for "house officers" has been built at a cost exceeding £71,000, containing a swimming pool, two squash rackets courts and lounge, a card room, a reading room, and sun rooms.

The Clinical Interpretation of Aids to Diagnosis.

A Series of Special Articles contributed by Invitation.

LXX.

THE SIGNIFICANCE OF BLOOD GROUPS.

PART I.*

ALTHOUGH the first steps towards the identification of the blood groups were made by Landsteiner so far back as 1900, it is only during the last ten years that medical students have been expected to know something of their nature and constitution. The matter has been immensely complicated by the fact that the existence of certain differences in the blood of human beings, differences which enabled them to be classed into four groups, was discovered and reported independently in Europe by J. Jansky and in America by W. L. Moss. The European observations, which preceded the American ones by two years, were unfortunately reported in a continental journal little read outside the country of its publication, and as chance would have it the two discoverers used different numerals to identify their groups. Moss's terminology holds in this country; that of Jansky has been largely adopted in America and on the continent, and as a consequence it is always uncertain what group is meant when an author refers to Groups I. and IV. In the present article it is proposed to discard the numerical indications of the groups and to use terms indicating their actual constitution, so far as is known. This is made possible by the work of von Dungern and Hirschfeld, who in 1911 showed that the existence of the four blood groups could be explained by the assumption of two different agglutinable factors resident in the red cells and two agglutinins corresponding to them resident in the plasma or serum. The agglutinable factors of the red cells, or as they are now described the agglutinogens, they called A and B, the corresponding agglutinins they designated by the corresponding Greek letters α and β.

Table I. shows the structure of the four groups according to the scheme of von Dungern and Hirschfeld and their correspondence with the numerical designations of Jansky and Moss.

TABLE I.

Agglutinogen.	Agglutinin.	Group.		
			Jansky.	Moss.
A and B.	Neither.	A B.	IV.	I.
A only.	β only.	A.	II.	II.
B only.	α only.	B.	III.	III.
Neither.	α and β.	O.	I.	IV.

The constitution of the blood groups as described by von Dungern and Hirschfeld has been called into question from time to time. Up to two or three years ago attempts were made by various authors to demonstrate that the agglutination phenomena could not possibly be so simple as they appeared, and that actually other agglutinogens in addition to those described as A and B must exist, with corresponding agglutinins. Recent work has made it fairly clear that the apparent exceptions discovered by various workers were due to errors of technique, and it is now generally admitted that the hypothesis of von Dungern and Hirschfeld suffices to explain the known facts.

These workers gave good grounds for believing that the factors A and B act as dominants and are transmitted from parent to offspring according to Mendelian laws. That this is true has since become abundantly evident; its importance is discussed below.

Blood Transfusion.

For some years after the demonstration of their existence the blood groups had no applications in clinical medicine. Their importance first became evident in connexion with the transfusion of blood; to instil the blood of a healthy subject into an anæmic patient appears to be an obviously desirable procedure and has enjoyed a varying vogue for some hundreds of years; it is only within the last half century, however, that surgical technique has made the operation really feasible, and it was not until the years immediately preceding the war that it enjoyed any widespread popularity. At that time blood transfusion was beginning to find its way into clinical medicine, but it was generally recognised that the procedure possessed the drawback that while in many instances the intravenous introduction of blood was beneficial, in other cases the results might be catastrophic. It was further realised that a blood which suited one patient admirably might be far from suitable to another. It was not until the war had made blood transfusion an almost daily occurrence that it was realised that it was only safe to introduce intravenously red cells which were not agglutinated by the serum of the recipient, otherwise the latter would become acutely ill, and perhaps die; if he survived he would develop hæmoglobinuria, become jaundiced, and in a few hours would be found to have lost all the infused blood.

Experience has now served to establish the general rule which must always guide the selection of donors for transfusion that *a compatible blood is one the red cells of which can neither be agglutinated nor lysed by the plasma or serum of the recipient.*

Reference to Table I. will show that given knowledge of their groups it is possible readily to ascertain beforehand whether or not the red cells of any proposed donor are capable of being agglutinated by the serum of any proposed recipient, in other words to determine compatibility. Thus the serum of an A B individual contains no agglutinins and can agglutinate no red cells; such an individual can receive blood from anyone—he is a "universal recipient." The blood of an A individual contains the agglutinin β; he must not receive blood from groups A B or B. Similarly a B individual must not receive blood of constitution A or A B. Individuals of the O blood constitution, since their serum contains both agglutinins α and β can receive blood from none but members of their own group, but may give blood to anyone; they constitute the "universal donors" and are much in request for transfusion services, so much so that possession of the O blood constitution has a distinct financial value, particularly in America.

Determination of Group.

Reference to Table I. will make it clear that to determine the group of any given individual there are required red cells from the subject of the test and known sera of Groups A and B. If on mixing the red cells with the sera agglutination occurs with both the A and B sera the subject belongs to Group A B; if agglutination occurs with the A serum only to Group B; if with the B serum only to Group A; and if with neither to Group O.

Selection of Donors.

Since Group O consists of the so-called "universal donors" it would seem simple enough, given suitable samples of sera of Groups A and B, to discover donors suitable for transfusion purposes. It is not, however, quite so easy as appears, since the agglutinin titre of the serum of different persons varies considerably, and even in the same individual the titre is subject to variations from time to time. Unless the user has long experience of his grouping sera, he can never be sure of their titre, and may without knowing it be using a serum too weak to identify in all cases the corresponding agglutinogen. As a result of the

* Part II. will appear next week.

variations in agglutinin titre he runs the risk of identifying as O a blood really of the constitution A or B, or he may even be led to regard as A or B bloods which are actually of the constitution A B. Thus blood of the constitution A or B may inadvertently be introduced into the circulation of a subject with sufficient α or β agglutinin in the serum to bring about agglutination or lysis of the red cells. The results of such an error are never beneficial and frequently disastrous.

Blood Matching.

There is only one safeguard against accidents of this sort, and that is direct matching of the bloods of the proposed donor and recipient. For this purpose are required a few drops of the serum of the proposed recipient and an emulsion of the red cells of the proposed donor. One drop of each of these is brought together on a slide; if neither agglutination nor lysis of the red cells occur the bloods are compatible.

In cases of urgency it is justifiable to use blood of a known or supposed donor of Group O without further testing, but where time allows matching should always precede transfusion. Most of the disasters reported in connexion with transfusion have occurred in cases in which compatibility was tested by grouping alone, without direct matching. I know of two cases in which, owing to weakness of agglutinin titre of the sera used, incompatible bloods were infused under the impression that they belonged to Group O. Actually in both cases they belonged to Group A.

There are good grounds for believing that death following incompatible transfusion is often due to blocking of the renal tubules by the hæmoglobin liberated from the lysed red cells. Precipitation of hæmoglobin from solution will only occur in an acid urine; when selection of donor is by group alone, without direct matching, it is advisable to attempt to render the urine alkaline. When the citrate method is used the infused citrate is usually sufficient to bring this about, but even so it is good practice to give alkalis by mouth; where citrate is not used this should always be done if there is the slightest possibility of incompatibility.

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Consulting Pathologist, the Royal Hospital, Wolverhampton.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg. Lt.-Comdrs. N. B. de M. Greenstreet and T. N. D'Arcy to be Surg. Comdrs.

Surg. Lt. J. V. Williams to be Surg. Lt.-Comdr.

The following appointments are notified: Surg. Comdr. T. N. D'Arcy to *Calypso*; Surg. Lt.-Comdr. D. H. Kernohan to *Norfolk*.

ROYAL ARMY MEDICAL CORPS.

Maj. J. H. Fletcher retires, receiving a gratuity, and is granted the rank of Lt.-Col.

ARMY RESERVE OF OFFICERS.

The undermentioned, having attained the age limit of liability to recall, cease to belong to the Res. of Off: Lt.-Cols. J. H. Brunskill and C. R. L. Ronayne.

TERRITORIAL ARMY.

Col. C. R. White, having attained the age limit, retires and retains his rank, with permission to wear the prescribed uniform.

Lt.-Col. (Bt. Col.) O. B. F. Planck, from 48th (S. Midland) Divl. Train, R.A.S.C., to be Col.

Capt. A. A. Watson, having attained the age limit, retires and retains his rank, with permission to wear the prescribed uniform.

Lt. T. Wallace to be Capt.

L. M. J. A. Pilot to be Lt.

TERRITORIAL ARMY RESERVE OF OFFICERS.

Col. H. Burrows, having attained the age limit, retires and retains his rank, with permission to wear the prescribed uniform.

Maj. A. C. M. Savege from Active List to be Maj.

ROYAL AIR FORCE.

The short service commission of Flying Officer Abraham Henry Barzilay is antedated to Oct. 1st, 1929, and he ceases to be seconded to the Royal Southern Hospital, Liverpool.

INDIAN MEDICAL SERVICE.

Col. W. C. H. Forster to be Maj.-Gen.

Capt. A. V. Lopes to be Maj.

Lt. P. J. Kelly to be Capt.

Special Articles.

GAUGING THE HOOKWORM LOAD OF A COMMUNITY.

BY CLAYTON LANE, M.D.,
LIEUT.-COLONEL, INDIAN MEDICAL SERVICE (RETD.).

IT is customary, before beginning anti-hookworm work in any community, to gauge its hookworm load by egg counts. The underlying assumption is that egg counts form a dependable index of the number of worms present.

A series of observations made by different persons during the last few years, but not necessarily made with that object in view, have thrown considerable light on several factors which influence the worm-egg ratio and are worth considering in some detail. But the ground must be cleared by certain preliminary comments.

First, nearly all egg counts have been made by methods whose individual accuracy is not admitted except by their sponsors or their sponsors' associates. That does not imply that when carried out on a large scale they do not allow of conclusions correct enough for the purpose considered in this paper. Secondly, no anthelmintic can be depended on to expel all worms, so that when using this means of obtaining and counting worms it is necessary to know and to state whether all worms can reasonably be assumed to have been expelled, and if not, what proportion remains. To attribute to a given number of worms an egg output really produced by quite a different number does not further knowledge.

Illness of the Host: Anthelmintics.

Both these extraneous influences on female hookworms may stop or lessen oviposition. An egg count on an obviously sick man, especially one with an intestinal complaint, is not reliable. Oil of chenopodium, for example, may influence oviposition for a fortnight after its administration. Accordingly, no egg counts must be made within that period of treatment if their object is to determine how effectively an anthelmintic has reduced the worm load of a community, nor should they be made during any epidemic.

Size of the Stool.

If two men harbour the same number of hookworms which oviposit at the same rate, but if the food of one man results in 100 g. of fæces daily and of the other in 200 g., the number of ova per gramme of fæces will be twice as great in the first as in the second; the size of the stool varies with personal and racial habits of feeding. But it varies also with the age, or rather with the size, of the host, for a child's stool is smaller than that of an adult, and there is nothing to suggest that the egg output of the female hookworm is less in one than in the other. Failure, then, to allow for the size of the stool will make inexact any attempt to estimate by egg counts the worm load of a community, and, if in addition the stools counted include those of children, this error will be increased. It may be noted, in passing, that this egg concentration in small stools will make less inaccurate the less accurate diagnostic techniques, so that when these are used merely to find out the number of persons

infected they will show a higher percentage in children than in adults when both carry the same relatively small number of worms. There are, of course, some infections so heavy that no technique can miss them.

Age of the Infecting Worms.

C. A. Herrick,[1] for *Ancylostoma caninum* in dogs and M. P. Sarles [2] for *A. braziliense* in dogs and cats, have shown that the daily output of eggs increases from the date when they first appear until a maximum is reached. That this occurs in man was shown by A. Looss in 1902 and 1903.[3] He examined at intervals about 0·01 c.cm. of fæces in suspension obtained from a man whom he had deliberately infected. Eggs were first found in this quantity of fæces about ten weeks after infection; they then numbered two, and eight weeks later had steadily increased to 31, remaining at about this level for months.

It follows that in those areas in which acquisition of infection is seasonal, the same egg count at different seasons, will be brought about by a different hookworm load; the one will form no constant measure of the other. In some parts of the world subject to hookworm infection, variations in climate make it likely that hookworm infection is acquired at certain seasons only, in other parts that acquisition is seasonally intensified.

Consistency of the Stool.

By his caustic soda method N. F. Stoll [4] counted the eggs in stools of seven persons, four passing formed, two passing mushy, and one passing liquid stools. Each received two treatments with 1·5 c.cm. of oil of chenopodium and the worms were collected by sieving through a wire mesh of 40 to the linear inch. Of only three cases is it reported that there was subsequent examination to determine the fact or extent of residual infection, and even in them the interval between treatment and re-examination is not stated. In the paper in which he reported these cases Stoll writes: "This dilution technique, subjected to continual scrutiny, only fosters the conviction that when properly used it constantly delivers counts even in light infestations correctly." The inference drawn by readers has probably been that this statement includes these post-treatment examinations. It is clear, of course, that, accepting Stoll's own conclusion noted below—namely, that a mushy stool contains 22 eggs for each gramme when a single female is normally ovipositing—there will still be inaccuracy even after examining from the same stool as many as seven specimens of 0·005 g. each, a number of specimens which few, if any, do examine, and a quantity of stool for each specimen which Stoll and Hausheer now advise.

Examinations in light infections have been reported by W. C. Sweet [5] and by P. A. Maplestone and A. K. Mukerji.[6] Sweet used the modification of Stoll's technique advised by Stoll and W. C. Hausheer,[7] and wrote: "In obtaining the average egg count all persons who gave no egg by the Stoll method were included in a zero count although a considerable portion of them showed eggs by the Willis method." Maplestone and Mukerji carried through several series of post-anthelmintic counts; only one need be quoted: "Eight of the 12 cases were negative to Stoll's count, whereas only one did not contain eggs as demonstrated by Lane's method"—that is, by direct centrifugal floatation (D.C.F.). Stoll's post-anthelmintic counts did not, then, really measure the residual infection, which he claimed to be 0, 2, and 6 per cent., even in the three cases in which he reports having attempted it.

R. B. Hill's [8] similar but more exact work may well give a better idea of the real state of affairs. After egg counts Hill gave to 462 persons one treatment by 2 c.cm. (ℳ 30) of oil of chenopodium and two others each by 4 g. (grs. 60) of thymol (a far more stringent régime than that used by Stoll), demonstrated the presence of persistent infection by Willis's gravity floatation method, and estimated its extent by Stoll's. Among those who refused to take more than these three treatments the egg counts after them were 33 per cent. of the originals. This matter has unfortunately to be stressed because, non-evidential as they are, it was on these four formed stools (confirmed by two others giving a somewhat higher rate) that Stoll concluded that each female necator produces eggs at the rate of 44 to each gramme of formed fæces, on these two mushy stools that the figure for that consistency was put at 25, and on this single diarrhœic stool that it was taken as 12 for watery motions, a proportion of 4, 2, and 1. The matter did not end there, for it has become almost obligatory for any one the world over, who wishes his investigation to appear serious, to adopt this ratio, and to express the worm load of a community as if all were passing fæces of one consistency, multiplying his individual counts by the appropriate figure. The need to do so does not, of course, emerge from these meagre data.

The conclusions of other persons are interesting. Docherty,[9] using Stoll's egg-counting method in Ceylon, found that the egg-worm ratios he obtained for formed, "soft-formed," and mushy stools were as 52, 48, and 40; if 52 is correct for the first, the last should, of course, have been 26 if Stoll's formula held. Herrick [1] found that in dog's fæces there was no relationship between stool consistency and the egg-worm ratio. The work of Augustine and his colleagues [10] is particularly interesting. Using the Stoll-Hausheer counting method, they agreed that Stoll's relationship of 1 to 2 between the ovum content of mushy and formed stools held for *A. duodenale* in Egypt, but stated that for *Ascaris lumbricoides* in that country it was 1 to 3. That is to say, the same fæcal material of the same consistency habitually diluted one fæcal constituent twice and another three times. This is impossible. Here, too, the suggested ratio cannot be accepted.

Insofar as it is water which, by dilution of solid matter, causes alteration in consistency, I have made the following investigations.*

The stool examined was spread thinly out within a small evaporating dish so that exactly 1 g. (measured to within 0·01 g.) was added to the dish. This was then placed on a boiling water-bath until the fæcal smear was quite hard. The percentage of solid matter remaining after the water was driven off was as follows: liquid stools, 3, 6, 6, 8, 8, 8, 8, 9, 10, 12, 15, average 8·5; mushy stools, 10, 13, 15, 17, 18, 20, 20, 20, 22, 23, average 17·8; formed stools, 18, 20, 22, 23, 26, 32, 32, average 24·7.

One liquid stool may then have five times as much solid matter as another and more than has a mushy stool; one mushy stool may have more than twice as much solid matter as another and more than has a solid one; and one solid stool may have nearly twice as much solid matter as another. The average solid matter of liquid and mushy stools was in this series as 1 to 2, but it seems optimistic to regard this as more than fortuitous; while the average ratio of solid matter in mushy and formed stools was far from being as 2 to 4. Clearly in these cases it is not through any dilution of solid matter by water that the Stoll formula of multiplication can be justified in stools of different consistency. There is, then, strong evidence that stool consistency does not produce variations in the worm-egg ratio sufficiently exact or constant to demand allowance in estimating the worm load of a community. Indeed Herrick found that when he made such allowance in dogs his results became erratic. In our present state of knowledge no such general formula is admissible; if in any locality an observer elects to use one, the responsibility rests with him to show first that it is locally applicable. The wide acceptance on this exiguous foundation of the need to allow for stool

* Part of work, under a grant from the Royal Society, carried out at the Seamen's Hospital Society's Hospital, Royal Albert Dock.

consistence by a definite formula is an illuminating illustration of the weight carried by authority in certain specialties, at least within tropical medicine, and shows how grave is the responsibility of anyone who may wield that authority lightly.

Intensity of Infection.

For *Ancylostoma caninum* in the dog, Sarles [11] found that as infections increased in weight each female worm laid fewer eggs. In one series each female produced 26,800 eggs daily when infection was by 16 of them; when it was by 187 females each laid 4500 eggs daily. With the number of worms increased twelvefold the fertility of each was reduced to a sixth, so that the total egg output was only doubled. It was clear to me that if anything of the kind held for man, no present or past attempt to measure the worm load by egg counts approached accuracy, and with this in mind it occurred to me to analyse the figures in R. B. Hill's tables,[12] the only material, so far as I knew, by which the matter could be tested. This work was executed in Florida in Porto Rico with great care and under close supervision, and was published with a well-based belief that all stools concerned had been obtained.

In a number of adults the total fæcal deposit was collected for either two or three days; by Stoll's egg-counting method the total number of hookworm eggs passed during each day by each person was estimated; each person was treated with 3 c.cm. of carbon tetrachloride and worm counts were made from the fæces passed for the next 48 hours; two gravity floatation (Willis's) examinations were made and the positive cases egg counted as before; whether found infected or not all cases received a second treatment, this time by 3 c.cm. of oil of chenopodium, and worms were again collected. Incidentally, it may be noted that only in 40 per cent. of cases were no worms recovered by the second treatment, so that the full dose of carbon tetrachloride (which dose has killed) left 60 per cent. of persons still infected. Two further examinations by Willis's technique passed 93 persons as disinfested.

From the very full details published regarding these 93 adults it is possible to discover the average egg output of each female necator in different grades of infection. When there were fewer than 300 female worms (average 111) the average daily egg output of each was about 4000, when it was between 300 and 600 (average 444) the egg output was about 2500, while when there were over 600 (average 897) the figure was about 1500. In other words, with the degree of infection increased fourfold the total number of eggs increased two and a half fold, with infection increased eightfold eggs increased only threefold. In the heaviest grade of infection it took eight worms to produce as many eggs as did three in the lightest, while as between medium and heavy grades, doubling the number of worms increased the egg output by 20 per cent. only. Two points are noteworthy: had Hill not published his protocols, his careful valuable work could not have been used to check for man Sarles's investigations on dogs; and, second, his work confirms Sarles's findings that with an increased load of infection each female hookworm lays fewer eggs. The conclusion is that the egg output cannot safely be used as an accurate measure of weight of infection of a community, nor, of course, of the extent to which mass treatment has been effective.

Species of Hookworm.

The work of Stoll and of Hill quoted above was on necator infections. From the inmates of a lunatic asylum in Queensland hookworms were recovered to the extent of 20 per head, 91·1 per cent. being ancylostomes. Sweet [13] re-examined the inmates 18 months later and, using Stoll's counting method and consistency formula, judged that they had become reinfected to the extent of 75 female worms apiece. This he held to be unreasonable. He did not, however, question either the technique or the formula, but concluded that ancylostomes laid five times as many eggs as necators.

W. W. Cort et al.[14] used Stoll's counting method for determining the egg-worm ratio of about 50 cases in a district of China. Stools were computed to average 100 g. This must be compared with 222 g. in the four cases on which Stoll announced that the female necator laid 44 eggs for each gramme of a formed stool, and which gave a daily output by each female of 9668 ova. The average daily total egg output by each female worm in China was 20,000, the ratio of necator to ancylostoma was as 2 to 3, the egg output of each female necator had been put as about 10,000, so that each female ancylostoma was producing 27,000 eggs daily. The paper does not, however, note the anthelmintic used, nor whether there was any attempt to determine that it produced disinfestation, so that the egg-worm ratio rests here too on an unscientific and precarious basis.

In one case of pure infection by each species of parasite Soper [15] found the daily egg output by each female ancylostoma to be about 20,000, and of each female necator to be about 10,000. Treatment was carried to microscopic cure as tested by D.C.F., used, however, without its efficient comminutor and probably not fully reliable; at the same time, for 25 female ancylostomes there were recovered only seven males, a rather unusual ratio. Soper sought confirmation of this 2 to 1 ratio by mincing up the bodies of 50 females of each species and counting their unlaid eggs. They also were present in about that ratio after the worms had been recovered by oil of chenopodium, alone or combined with carbon tetrachloride.

Augustine et al.[10] investigated the egg-worm ratio in Egypt where *A. duodenale* alone is present. Cases were treated with 3 c.cm. of carbon tetrachloride and 1·5 c.cm. of oil of chenopodium. The Stoll-Hausheer technique was used to make counts before and after treatment. More than one count was usually made on each occasion, or, in other words, the amount of stool examined was not invariably more than 0·005 g. The table given in the paper is not easy to understand (the number of cases is cited equally as 74 and 314 and the symbols are not all explained), but it seems that when two fæcal preparations were examined an egg was found in only one of them in 38 per cent. of all cases—that is, one egg in 0·005 g. of fæces. The findings were brought to the basis of formed fæces, the formula for which, as noted above, was held to be different for hookworms and ascaris and so is quite unacceptable. It was concluded that the female ancylostoma lays eggs at the rate of 238 for each gramme of fæces. The size of the fæcal output is unstated, and the paper does not contain the protocols which would enable others to form their own conclusions as to the value of the observations. At least the conclusion is precarious.

Evidence as to the relative ovipositing power of ancylostomes and necators is, then, meagre, but such as there is, together with the relative bulk of the two worms, suggests that it will prove to be about as 2 to 1.

Conclusion.

It has been seen that general health, size of stools, seasonal or continuous acquisition of infection, intensity of individual infection, and the species of worm concerned may all greatly influence the hookworms' egg output and ought all to be taken into account in attempting a true estimate of the worm load of a community; and that the question of consistency of stool on which so much stress is being laid is an uncertain and inadequately measured factor which has been quite unduly emphasised. It follows that egg counts have not hitherto measured dependably the worm load of a community and can only be made to do so with great difficulty. For certain investigations accurate egg counts are essential; they have indeed been in the past, and will be in the future, of the greatest value. But, as usually undertaken with the idea of obtaining the real measure of the worm load of a community, particularly the load before and after mass treatment, it

must be concluded in our present state of knowledge that they are, in spite of their reassuring appearance of accuracy, a waste of time and money.

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THE RISE IN SICKNESS CLAIMS IN THE INSURED POPULATION.

INVESTIGATION BY THE GOVERNMENT ACTUARY.

Sir Alfred Watson, the Government Actuary, has made an examination of the sickness and disablement experience of a group of approved societies in the period 1921–27, and has reported[1] the result to the Minister of Health as chairman of the Joint Committee of National Health Insurance. A previous analysis of the sickness and disablement experience in the years 1921–23 of a representative sample of the whole body of insured persons was made for the Departmental Actuarial Committee set up to advise the Royal Commission, and was published as an appendix to the report of the Commission. The original sample included some 500,000 men and 400,000 women whose experience was followed through three years 1921, 1922, and 1923. On the present occasion it was regarded as adequate to work upon the experience of societies including about 50 per cent. of the membership in the original sample with the added precaution of taking out the experience of the new sample for each of the years 1921, 1922, and 1923 as well as for the subsequent years, so as to show the experience of a particular and representative group of societies for each year from 1921 to 1927. The membership at the last valuation date of the societies in the new sample comprised 219,000 men, 172,000 unmarried women and 64,000 married women. The latter were thus 27 per cent. of the total number of women, a somewhat higher proportion than that found in the insured female population generally, but from the present point of view the difference is immaterial, separate analyses having been made throughout of the respective experiences of the married and the unmarried. Widows are grouped with spinsters under unmarried women.

Upward Movement of the Claims.

The percentage of the actual weeks of sickness and disablement benefits respectively, in each year, to the corresponding provision made for these benefits by the present valuation basis is shown in Table I.

It is explained that this provision is such as to reproduce, in the case of men, the expenditure which would be incurred if the claims were in agreement with the Manchester Unity experience, 1893–97, due allowance being made for the exclusion of the first three days. A small adjustment is made, in accordance with the present basis of valuation, to assign rather less of the claims to sickness benefit and rather more to disablement benefit than the actual Manchester Unity rates would indicate. As the total cost provided for on the new basis is the same as would be incurred on the Manchester Unity standard without any adjustment, while an increased proportion of the claims is assigned to disablement benefit, it follows that the total quantity of incapacity provided for is slightly more than that shown in the Manchester Unity Tables.

In the case of women the basis is the actual experience of the "Selected Societies" in the year 1923 (as obtained in connexion with the work of the Royal Commission) with an addition of 10 per cent.

TABLE I.—*Percentage of Weeks of Sickness to "Expectation."*

Year.	Men.		Women.			
			Unmarried.		Married.	
	S.B.	D.B.	S.B.	D.B.	S.B.	D.B.
1921	76	54	73	60	63	66
1922	89	65	88	67	82	73
1923	86	72	91	77	92	90
1924	97	81	105	86	110	104
1925	98	83	112	99	121	125
1926	108	93	112	111	124	146
1927	107	100	117	119	130	171

S.B and D.B. = sickness and disablement benefit respectively.

From Table I. it will be seen that in respect of each of the three classes of insured persons the claims for both sickness benefit and disablement benefit have been rising continuously during the seven years. Comparing 1927 with 1921 the claims for sickness benefit have risen in the case of men by 41, of unmarried women by 60, and of married women by 106 per cent. For disablement benefit the corresponding increments are 85, 100, and 159 per cent. In the early years of the period the moderation of the claims was, says the Actuary, a factor of substantial importance in the production of valuation surpluses. Since 1926 in the case of men, and 1924 in the case of women, the position in this respect has undergone a serious change.

Their Number and Duration.

Two factors enter into the average rate of sickness or disablement: (1) the proportion of members who make a claim, and (2) the average length of the period over which the claim lasts. If the claims are rising and it is desired to analyse the cause it is obviously necessary to examine each of these factors, as is done in Table II., the figures in which relate to all ages from

TABLE II.—*Analysis of Claims with Reference to Number and Duration.*

A. = Weeks of claim to each 100 members.
B. = Number of members claiming in each 100.
C. = Average duration of claims within the year (weeks).

Year.	Men.			Unmarried women.			Married women.		
	A.	B.	C.	A.	B.	C.	A.	B.	C.
Sickness Benefit.									
1921	67	14	4·8	73	12	6·1	135	19	7·1
1922	78	18	4·4	89	15	5·8	176	25	7·0
1923	76	17	4·5	92	15	6·0	199	27	7·2
1924	86	20	4·3	106	19	5·7	238	34	6·9
1925	87	21	4·1	113	20	5·5	262	37	7·0
1926	97	20	4·8	114	19	5·9	268	36	7·5
1927	95	23	4·2	120	21	5·6	282	38	7·3
Disablement Benefit.									
1921	38	1·5	25·4	55	1·9	28·7	76	3·3	23·4
1922	46	1·8	25·2	63	2·2	28·0	85	3·6	23·9
1923	52	2·0	26·3	72	2·6	28·2	106	4·5	23·4
1924	59	2·2	26·5	81	2·9	28·1	123	5·4	22·7
1925	61	2·2	27·1	94	3·3	28·3	147	6·9	21·4
1926	68	2·5	27·3	106	3·7	28·9	174	8·1	21·6
1927	73	2·6	27·7	115	3·9	29·1	204	9·2	22·2

16 to 65 combined. It will be seen that the average duration of claims (per claimant) for sickness benefit within the year has not altered greatly in the seven years as respects either men, unmarried women, or

[1] National Health Insurance. Cmd. 3548. H.M. Stationery Office. 1930. 4*d*.

married women. The average for men may be put at four and a half weeks, for unmarried women at something under six weeks, and for married women at something more than seven weeks. On the whole the tendency is downwards in the case of men and unmarried women. Among married women it is rather the other way. The significant fact is the growth in the number of claimants. In this respect the years 1921 and 1927 show the two extremes. Taking men, it is seen that, while 14 out of every 100 claimed sickness benefit in 1921, the proportion had grown to 23 in 1927. Among unmarried women the respective proportions were 12 and 21, and among married women 19 and 38. The growth in the intervening years, though not regular, was practically continuous. The position as to disablement benefit is similar, save that the growth is more regular. The average duration of disablement benefit tends to increase among men but not among women. Indeed, the average duration of disablement benefit among married women shows a tendency to diminish, though it may be surmised that this is due rather to the increasing proportion of cases of recurrent claims by women who had previously exhausted their righ tto sickness benefit, and who were accordingly paid at the disablement rate, than to any shortening of the duration of the really protracted claims. The average duration of disablement benefit within the year in 1927 was between six and seven months per claimant in the case of men and unmarried women, and about five months in the case of married women. The significant feature again is the growth in the number of claimants. Among men the claimants for disablement benefit increased from 15 per 1000 members in 1921 to 26 per 1000 in 1927. Among unmarried women the respective figures are 19 and 39, and among married women 33 and 92. The general position as to married women is very striking; in 1927, of every thousand such women 380 drew sickness benefit and 92 disablement benefit. Of the 92, some 42 drew both sickness and disablement benefit. Of every thousand married women therefore, 430 drew either sickness benefit or disablement benefit or both in 1927.

The Effect of Age.

The question arises as to whether the continuous increase in the number of claims, while their average duration remains the same, is general, or whether the element of age is significant in regard to them. Two tables in the report show the number of claimants for sickness and disablement benefit respectively per hundred members in each age-group in the years 1921, 1924, and 1927 (figures being given separately for men, unmarried women, and married women) and the average duration of claim (per claimant) within the year. The growth in the number of claimants for sickness benefit is, then, seen to have prevailed in all age-groups; this applies equally to men, to unmarried women, and to married women. Between 1921 and 1927 the increase is roughly 60 per cent. throughout among men, 75 per cent. among unmarried women, and 100 per cent. among married women. While the experience of the year 1924 occupied an intermediate position it was distinctly closer to that of 1927 than to that of 1921. The position as to claims for disablement benefit is indistinguishable from that of the sickness claims. In both cases there is a universal increase in the numbers claiming.

So far as disablement benefit is concerned it is explained that in the early years of the system a regular increase in the number of the permanently sick was expected and was provided for in the finance of the scheme. Since National Health Insurance was applied compulsorily to those who were in employment on July 15th, 1912, or who entered employment later, the insured population at the outset included no persons who were already disabled; cases of permanent invalidity among the insured would therefore begin at a very small number and would continuously increase until a stable condition was reached, and the insured population had accordingly become normally constituted from this point of view. The period during which the number of permanent invalids would accumulate was actuarially estimated at about ten years, and while the disturbance of industrial conditions set up by the war may perhaps have resulted in its extension, it is improbable that it went on till 1927. In any case this factor, even if it were still operating in that year, would only serve to explain a moderate increase at the higher ages in the number of recipients of disablement benefit; it could not account fully for the increases shown from, say, age 40 onwards. At the younger ages, where the feature is equally marked, this theory of "natural causes" is still less available as an explanation of the increase in the claims for disablement benefit. Among unmarried women aged 25 to 29, 1·7 per cent. drew disablement benefit in 1921 and 3·0 per cent. in 1927. A preponderating number of the group who were of these ages in 1921 had been insured for nine years (having all been aged 16 and upwards in July, 1912), while those who were of the same ages in 1927 had probably been insured on the average for about ten years. It is obviously quite impossible that the addition, on average, of something between one and two years to the period of insurance in which permanent incapacity could have developed would explain an increase which almost doubles the relative number of the recipients of disablement benefit in 1927 as compared with 1921.

The tables show further that while, in regard to men and unmarried women, the average duration of a claim had fallen perceptibly at ages under 45 between 1921 and 1927 the difference at the higher ages was very small, and on the whole represented an increase rather than a decrease. In these circumstances some further analysis seemed desirable. A distribution of the claims to sickness benefit of men in the years 1921 and 1927 was accordingly obtained.

This analysis was limited, by practical considerations, to cases in which sickness benefit arose in the year of record and was subject to the three days' waiting period. It accordingly excluded cases in which sickness was current at the beginning of the year and cases in which a claim arising in the year was linked up with one that ended in the previous year. There was also excluded a very small class in which the claims, while beginning in the year and being subject to the waiting period, ran on beyond 26 weeks. These limitations on the data were not considered likely to diminish such value as the results might have. The analysis was adjusted to eliminate the disturbance due to the fact that the membership of the sample increased fairly substantially in the seven years.

Analysis showed that at the ages under 45 the number of claims of very short duration increased very greatly, the maximum being an increase of 88 per cent. in respect of claims of over two and under three weeks. For claims of longer duration the increase was smaller. After the first four weeks' sickness there is a quite definite drop in the excess of 1927 over 1921, the decrease continuing as the duration advances. At the ages 45 to 54 the greatest amount of excess is still at duration two and under three weeks. A decrease in the excess as duration advances is not pronounced in this section except in claims of a duration of thirteen weeks and upwards. At the highest age-group (56–64) the percentage increase in 1927 over 1921 is irregular and there is no significant trend among durations up to thirteen weeks. After the duration of thirteen weeks there is a definite drop.

General Conclusions.

The chief conclusion drawn by Sir Alfred Watson is that a continuous growth in the number of persons claiming benefit has been experienced, and that the increase is most pronounced, on the whole, in the claims of short duration. With reference to the question whether these features are persisting, he finds that the claims for sickness benefit in 1928, taken over the whole insured population of Great Britain, were about 91 per cent. of the claims of 1927 in the case of men and 94 per cent. in the case of women. On the other hand, the experience of 1929, as indicated by the first 39 weeks, payments of a number of societies covering nearly 50 per cent. of the insured population, shows a serious rise, in the case of both men and women, over the corresponding period of 1928. Disablement benefit shows a further rise of a few points in the case of both sexes in 1928, and a slight increase in 1929 over the level reached in 1928. Taking both benefits together, it must be concluded that the conditions of 1927 have not subsequently been alleviated.

Sir Alfred Watson has confined his report, as far as possible, to a statement of the statistical results of the analysis which he has conducted. The various questions to which the results may give rise are, he adds, matters for administrative deliberation and, doubtless, for consultation with the medical profession and the governing bodies of the approved societies.

Disablement Benefit: Two Special Inquiries.

Certain statistics obtained in the course of the work of the Actuarial Committee which advised the Royal Commission, suggested that inquiry might profitably be made in regard to two points: (*a*) the extent to which insured persons "declared-off" the funds of approved societies soon after benefit was reduced from the sickness rate to the disablement rate; and (*b*) the extent to which such persons subsequently became claimants for either sickness or disablement benefit. Sufficient data to enable these questions to be examined were accordingly obtained and analysed, and the results are given in the following paragraphs.

Question (a).

An examination was made of the cases, numbering 7155, in which recipients of sickness benefit in the year 1927 had passed on to disablement benefit. The cases were almost equally divided between men, unmarried women, and married women, the respective figures being: men 2320, unmarried women 2250, and married women 2585. These figures are in themselves somewhat arresting, considering that the relative proportions in which the three classes enter into the sample experience are: men 49 per cent., unmarried women 37 per cent., and married women 14 per cent. They may be regarded as a corollary to the facts that in 1927 the average duration of sickness claims over a large part of the table was about 50 per cent. higher among unmarried women, and from 50 to upwards of 100 per cent. higher among married women, than it was among men. Of the 7155 persons who entered on disablement benefit during 1927, 3997 "declared-off" within the year; of the remaining 3158 cases 220 died during the year, and 2938 were still drawing benefit on Dec. 31st.

The results show that (1) a high proportion of "recoveries" after entry on disablement benefit is common to both sexes and to all ages, but (2) the proportion is much heavier at the younger ages than at the older, and (3) is specially heavy, at any rate up to the age of 50, among married women. The fact that the "recoveries" do not include the cases in which the recipient came down to the disablement rate late in 1927, and "declared-off" early in 1928 emphasises the conclusion to be drawn from this table.

It remains to be considered for what periods the insured persons who "declared-off" continued to draw benefit after being reduced to the disablement rate. Of all claimants who passed from sickness benefit to disablement benefit in 1927, and ceased to draw benefit before the end of the year, more than one in six went off the funds almost immediately the benefit was reduced to the disablement rate. Within a month of the reduction 50 per cent. had been certified as capable of work, and within eight weeks 70 per cent. had found their working capacity restored.

Question (b).

The Government Actuary states the results of a statistical examination of the "after-history," in regard to claims, of those persons who "declared-off" disablement benefit in the course of the year 1924. The period of examination is limited to the years 1925 and 1926. There were 5063 such cases, of which 630 had again returned to benefit before the end of 1924 and were still on the funds at the end of the year. These 630 cases have not been further investigated; they are part of a group of intermittent claimants, of the existence of which the facts relating to the 4433 cases in which the "declaration-off" was followed by no further claim during the year will afford sufficient evidence. Of the 4433 cases it should be explained that in 3597 cases the insured person had "declared-off" disablement benefit only once in the year. In 836 cases, on the other hand, there had been at least one previous "declaration-off" disablement benefit within the year, followed by a renewed claim to this benefit; it was the termination of this subsequent claim within the year that brought the case within the scope of the present section of the inquiry. There is no great difference between the sexes or between the two classes of women in regard to the point now under investigation. Of 4433 persons who ceased to draw disablement benefit in 1924, 1854, or no more than 42 per cent., did not claim benefit in the next two calendar years. Analysis of the 2579 persons who returned to benefit in 1925 and 1926 after ceasing to draw disablement in 1924, showed that 1218, or approaching 50 per cent. of them, came back on the funds in 1925 and, having been capable of work for less than a year, were again placed on disablement benefit. So far as questions of supervision are concerned cases of this type are, says Sir Alfred Watson, probably not specially significant, but it is doubtful whether the same view should, in general, be taken of cases in which, after drawing disablement benefit, the insured person "declared-off" and subsequently claimed again after an interval not much exceeding the minimum necessary to enable him (or her) to requalify for the full sickness benefit. It would seem probable that such cases represented fully 15 per cent. of all who relinquished disablement benefit in 1924.

THE BELLE VUE SPA, TREFRIW.

OPENING OF THE PUMP ROOMS.

THE therapeutic properties of the water of Trefriw have been known for more than half a century, but like other natural waters it tends to lose these properties on exposure to air, and for that reason its value has probably been under-estimated in the past. At the Belle Vue Spa, which was opened on April 26th by Sir Arbuthnot Lane, the water is collected in an old Roman pyrites mine, where it drips from the rock into funnels which lead into large containers. To prevent contact with the air there is a layer of liquid paraffin on the surface of the collected water; bottles are filled from the containers by means of pipes, care being taken to exclude air bubbles, and a large tank is fed from the containers, in which it is intended to store water for baths. Mr. Carel Hoefftcke, who has played an important part in establishing the new centre, is considering a method for bottling under water, suggested by Dr. Judd Lewis, who has been asked to advise on the best means of preserving the physicial properties of the water during transport. It is believed that with suitable precautions the water can be bottled so that it will preserve its therapeutic value for a long period.

Qualities of the Water.

The water of Trefriw differs from most natural waters in containing iron in the form of ferrous sulphate and not as the carbonate. It also contains silica, which is unusual, and free sulphuric acid, but does not contain ferric salts, copper, nickel, or zinc, and no high proportion of aperient salts or sulphuretted hydrogen. The strength of the Trefriw water varies in different streams, but is such that it is only surpassed by the Matchless well in Alabama; similar springs in Germany, Sweden, Scotland, and the Italian Tirol have a lower concentration of ferrous sulphate in their waters. The Trefriw water is to be standardised at gr. 1 of ferrous sulphate per ℥i. and the dose will be ℥i; taken in larger quantities the water acts as an irritant and may produce symptoms resembling dysentery. The origin of the water is thought to be a lake some three miles away, whence it percolates through the iron-impregnated rock to the old pyrites mine.

The pump room of the new spa stands on the banks of the river looking towards the famous Trefriw

valley. Like the house in "Peter Ibbetson," it might be called "Parva sed Apta"; at either side of the central pump room are baths and dressing-rooms, and parts of the main room can be curtained off for special treatment. Massage, manipulative and light treatment will be carried on under the supervision of Dr. Williams, who has been in practice near Trefriw for many years. The free sulphuric acid of the water gives it some of the same properties as the acid waters of New Zealand, when used for baths; it has a local irritant action which causes reddening of the skin and increased circulation in the peripheral capillaries.

Terrace of Belle Vue Spa with the village of Trefriw.

The Opening Ceremony.

Sir ARBUTHNOT LANE, in his opening address, spoke of his personal debt to the managing director, Mr. Hoefftcke, whose view that inflamed joints should be treated by traction and movement he had on many occasions adopted, with beneficial results to his patients. Trefriw, he said, had once been a famous beauty spot to which visitors came yearly, but for some unaccountable reason its popularity had declined, and with it the prosperity of the inhabitants. It was to be hoped that among its other advantages the new spa would restore the old prosperity to Trefriw. The climate of the valley was particularly suitable for the treatment of rheumatoid arthritis and other joint affections, and this, combined with spa treatment, should help to make Trefriw one of the most important health resorts in Great Britain.

Dr. FORTESCUE FOX said that the interest of scientists was becoming awakened to the value of physical treatment. The water of Trefriw stood at the head of all waters containing ferrous sulphate in Europe, and was only exceeded by the well in Alabama. The value of these waters lay in the highly assimilable form of the iron, a quality which was lost on exposure to air. As usually happened with natural waters, the properties had been discovered by the inhabitants, so that a local tradition became attached to the place. In France the discovery of a natural spring of this type would lead to investigation by the Commission des Eaux Minérales, and the official establishment of a health resort. No such advantages were to be had in England; he would like to see all British natural waters developed under official auspices. As early as 1757 Dr. John Rutty, of Dublin, had published a book ("A Methodical Synopsis of Mineral Waters") deploring the spread of German spa waters with consequent decrease in the use of English and Irish waters. In describing the properties of natural waters he had observed that the native qualities of some were only obtained at the fountain, that those who took the waters should not also take tea, that a milk diet appeared to be helpful during a course of treatment, and that persons who felt the cold could take the waters warm in bed in the mornings with advantage. He had gone on to say that these natural waters, though they seemed to be but weak tinctures of iron, had subtle qualities which gave them more power than artificially prepared waters. These observations of Dr. Rutty were as sound to-day as they had been in the eighteenth century. The therapeutic value of natural waters rested on a valid basis, not on account of their chemical composition, but on account of the energy they introduced, and their power of assisting the elimination of waste products. When the waters left the fountain they underwent changes not in chemical but in physical composition. To have their full value they should be under chemical study and supervision, such as Dr. Judd Lewis was undertaking for the waters of Trefriw. A continental authority on natural waters had described them as being of value to the lymphatic, the neuropathic, the dyspeptic,

The view from the terrace overlooking the Conway.

[*Photos by L.N.A.*

the convalescent, the tropical invalid, the tired brain worker, and the arthritic. Bath treatment would have its place at the new spa, and certain cases would benefit both by the waters and by manipulative treatment. Dr. Fox concluded with a quotation from Dr. Rutty: "How much could be done if our own people could be persuaded to lay aside their unrighteous prejudices against the productions of their own country."

Major GORONWY OWEN, Member of Parliament for Carnarvon, who took the chair, said that the decline in prosperity of Trefriw of late years, in spite of attempts to improve conditions, had been progressive. The new spa should give an opportunity for the town to reinstate itself.

Sir ARBUTHNOT LANE illustrated the difference between natural and artificial waters by a reference to sea water. Salt water, chemically indistinguishable from brine but artificially prepared, was fatal to fish. But if 2 per cent. of true sea water were introduced into the solution, fish could live in it without difficulty.

At the conclusion of his speech Sir Arbuthnot declared the spa open.

SCOTLAND.

(FROM OUR OWN CORRESPONDENT.)

The Aberdeen Chair of Medicine.

ON the recommendation of the Secretary of State for Scotland the King has appointed Dr. Leybourne Stanley Patrick Davidson to be Regius professor of medicine, in the University of Aberdeen in the place of Prof. Ashley Watson Mackintosh, who has resigned.

Dr. Davidson, who was educated at Cheltenham and Trinity College, Cambridge, is 36 years of age and served with the Gordon Highlanders for three years during the late war, reaching the rank of captain. He was severely wounded and returned to his medical studies at Edinburgh in 1917, graduating with first-class honours two years later. He gained the gold medal for his M.D. thesis in 1925 and was elected a Fellow of the Royal College of Physicians of Edinburgh. Since 1927 he has been assistant physician to the Royal Infirmary, and for the past two years he has also been lecturer in systematic and clinical medicine in the university. After holding resident appointments he worked for three years in the department of bacteriology, and his earlier publications were largely bacteriological. His recent papers include several on pernicious anæmia published in THE LANCET, and a book on the same subject written in collaboration with Prof. Lovell Gulland.

Medical Service in the Highlands and Islands.

Your correspondent, "Viator" (April 26th, p. 939), calls attention to the absence of any superannuation assistance under the Highlands and Islands Medical Service. The Dewar Committee contemplated that, under a special scheme, it might be possible to enable certain parochial medical officers to retire. But it certainly made no recommendation about a contributory scheme of any kind. It is to be remembered that, under the Statute, each of the medical practitioners in agreement with the Highland and Islands Board (afterwards with the Board of Health, now the Department) was and is dealt with as an individual. No special schemes were ever approved for superannuation, or an allowance on retirement. In one or two extreme cases, I am informed, it was arranged to provide a parish with a second medical officer to overtake the more distant work, so relieving the older principal, whose obligations now covered a much smaller area. But no general arrangement of any kind was ever in force. If a contributory system were contemplated, the methods of subsidy would have to be materially altered.

"Viator" hopes "now the financial conditions are adequate, that a satisfactory scheme for superannuation of the medical officers will be granted by the Department in the interest of the efficiency of this essential medical service." It is proper to state that the Highlands and Islands Medical Service is not a whole-time State medical service. Under the various schemes subsidies are given to individual doctors in private practice and in no case does a man's whole salary come from the Fund. The practices are classified roughly into two types: First, where it is not possible for the doctor to earn a reasonable living for work done, the Fund supplements the salary to an accepted minimum net income. The number of these practices in 1923 was 35. Secondly, in other cases, the practitioner is compensated for such loss of income as he would incur if he attended distant patients at the same fee as near patients, these fees being specified by the Department. There are many large practices with poor areas. These practices would not normally require a subsidy; but the attendance on the more necessitous districts can be carefully estimated and compensation made on this estimate. The doctors must furnish details of their income confidentially and, where necessary, the amount of the subsidy is discussed confidentially with an officer of the Department. In this way arrangements have been made satisfactorily to the practitioners, and the Department are enabled to maintain an efficient practice.

On the terms of this system of subsidised individual practices a superannuation scheme would be somewhat difficult to frame. But under the new Local Government Act, another factor will enter into the case—namely, the consolidation of all the medical services under a large county authority. These official services will include the ordinary public health services, public assistance (medical), school health, maternity and child welfare, and the nursing services attached to all these. It will include also specialist services—surgical, medical, and dental. Schemes are already in existence under the H. and I. Fund to cover such specialist services and in each of three centres a consulting and operating surgeon has been established, chiefly at the expense of the Department. No doubt other such arrangements will ultimately follow. The re-grouping of hospital services will help this process. When the transitions to the new system are complete, it may become possible to establish at least a pro tanto superannuation scheme to cover certain officers. I believe that, although no such scheme has as yet been elaborated or even fully considered, the new conditions will compel attention to the matter, just as in the case of the medical officers of health and allied officers. Meanwhile, as indicated in the evidence laid before the late Royal Commission on insurance, arrangements are in force whereby practitioners in some single doctor areas are assisted to provide for the work of their practices during holidays. With the ear-marked part of the Fund, the Department of Health are able to give assistance about once in every three years to each of the practitioners eligible for the benefit. The Department's assistance normally relieves the doctor going on holiday of his deputy's fee and travelling expenses to and from the practices. The Department have power also to assist practitioners to attend post-graduate courses of study, but, according to the latest information available, there have been no applicants for such courses. The intention of the Department was and is to make the conditions of general practice in the Highlands as nearly as possible equivalent to the conditions in the Lowlands. In the Lowlands, it is well known, there is a fund under National Health Insurance to supplement the incomes of doctors in certain necessitous areas, many of which are really as much in need of a subsidy as are many parts of the Highlands.

The new scheme of concentrated local authorities is now proceeding satisfactorily in the Highlands, and there is little doubt that the matter of superannuation and holiday relief will not be lost sight of. One broad result of the many schemes is, whereas formerly

it was difficult to get an applicant for a vacant parish medical officership, now it is no uncommon experience to have 50 or 60 applicants to choose from. It should be added that, under the Act passed last session, the supplements to the Fund must be voted from year to year by Parliament. The sum is not limited and, from the tone of the report of the Committee on the Bill and from statements subsequently made by Ministers, there seems to be a general Parliamentary understanding that the supplementary sums from year to year shall make possible a really adequate surgical, medical, and nursing service for the whole Highlands. The total population involved in the Highland area, as defined by the Statute, is only some 320,000, and the number of practitioners involved is round about 150. Many of the Highland practitioners, of course, have not agreed to come under the schemes of the Department. This was not, at least at the outset, due to any opposition by the practitioners to the schemes as such, but simply to the fact that those practitioners were fully occupied in their private practices.

IRELAND.

(FROM OUR OWN CORRESPONDENT.)

Resignation of Dr. H. T. Warnock.

Dr. H. T. Warnock, who has been for 50 years medical officer of the Donegal dispensary district, has just resigned that post. His resignation was accepted with regret by the County Donegal Board of Health, the members of which gave expression to their deep appreciation of the value of his services. Dr. Warnock has, indeed, for many years held a unique position in the north-west of Ireland. He has been the leading medical man in an area of several counties, and enjoyed the full confidence of the practitioners as well as of the public over that area. Outside his own district he has been well known in professional circles. He has given long service to the Council of the Irish Medical Association, and has filled the office of president. No medical man in Ireland is held in more general respect and affection.

The late Prof. J. P. Henry.

Dr. John Patrick Henry, or Seaghan P. MacEnri, as he was known of late, who died on April 16th, at Galway, was a man of varied activities, and of success in two different careers. Born in County Sligo, and educated at Trinity College, Dublin, he practised for several years in London as an ophthalmologist. He was for a time clinical assistant to the Royal Westminster Ophthalmic Hospital, and was honorary ophthalmic surgeon to the Italian Hospital, and oculist to the London School Board and the London County Council. He was greatly interested in the language and history of Ireland, and some 25 years ago he returned to Dublin and practised as an eye surgeon, devoting all his spare time to the revival of the Gaelic tongue as a spoken language. After some years in Dublin he was appointed to the two posts of professor of ophthalmology and otology, and lecturer in modern Irish in University College, Galway, National University of Ireland. He wrote several manuals for students of modern Irish, and was for a time president of the Gaelic League. He was reputed to be a ripe scholar of Gaelic, and he was enthusiastic in the movement of the Gaelic revival. At the same time he was a man of wide culture, and did not allow his enthusiasm to swamp his common sense.

The late Dr. William Hariot Mayne.

Dr. W. H. Mayne died on April 4th at his home in Warrenpoint, Co. Down. He was born in 1872, educated at Clifton College, Bristol, and took his medical course in the Richmond Hospital and Trinity College, Dublin, where he qualified in 1896. After some time spent at sea he commenced practice in Warrenpoint. Dr. Mayne was a man of wide interests. He was an extensive landowner, and took an active part in the political, social, and religious life of South Down. He was, moreover, a keen and prominent Freemason, and was at one time Provincial Grand Master of Down.

NOTES FROM INDIA.

(FROM OUR OWN CORRESPONDENT.)

The Degrees Controversy.

WHEN the scheme for an All-India Medical Council was prepared last year, the provincial Ministers were consulted. Largely, it is understood, because they were proud of their responsibilities, and feared that the scheme would interfere with provincial autonomy, they refused to accept it. The *Pioneer*, however, states that they unanimously supported the appointment of an inspecting officer, pending negotiations with the General Medical Council, and agreed to contribute funds for this purpose; but the Standing Finance Committee of the Assembly, in September, refused to assent to a token grant for the appointment, and when the question was brought forward in the Assembly itself direct opposition was at once apparent, and the proposal was dropped. Since that time, however, some progress has evidently been made. The Government of India has informed the Secretary of State that the local governments now agree that the only solution of the present difficulties is to be found in the establishment of an All-India Medical Council, and the Secretary for Education, in reply to a question in the Assembly on March 20th, undertook that every endeavour would be made to proceed with that project without any avoidable delay. But as had already been stated it would not be possible to introduce the necessary Bill during the present session. It is said that special measures are being concerted for the benefit of those students who will qualify at Indian universities during the next few months, and apart from this there is evidently no possibility of anything definite being done before the autumn. The breach is, therefore, so far as can be seen, likely to continue for some considerable time.

Feeling in the Assembly.

The fact that the critical stage of these negotiations coincided with a period of intense political unrest accounts for the failure to arrive at a provisional understanding, to tide over the period which must intervene before the projected council can become an accomplished fact. When the question was being debated in the Assembly feeling was running so high that non-medical politicians, who might under ordinary circumstances have been little interested, took it up as a useful additional plank in their platform, and it ended by being dealt with more on racial and nationalistic than on medical grounds. One regrettable feature of the controversy has been the readiness of Indian medical men of good status—some of them holding the highest British qualifications—to enter the field in an uncompromising manner against the Government, the General Medical Council, and even the Indian Medical Service, which has been several times dragged into the debate by main force, though for what reason, except the mention of the name of one officer in connexion with the proposed temporary inspectorship, it is difficult to divine. The most eminent and successful of Indian practitioners seem unable to forget or forgive the former privileged position of the Service, even when alluding to the undoubted fact that they have now succeeded in displacing these officers from many of the most coveted appointments, and in some areas have absorbed most of the remunerative practice.

Suggested Retaliation in Bengal.

The recent rupture is the culmination of a whole series of arduous negotiations, any one of which

might have ended in disaster if it had not been for the goodwill of the General Medical Council and various official and non-official well-wishers in India, and the breakdown, now it has come, is all the more regrettable for that reason. It is difficult, in fact, to regard this deadlock with equanimity, in view of the quite hopeful prospect that an All-India Medical Council, which will be acceptable to the British council may be created within the next few months. Already some evil fruits of the rupture can be seen. In the January number of the *Calcutta Medical Journal* the editor, Dr. B. C. Roy (who holds the M.R.C.P. Lond. and F.R.C.S. Eng., and is a member of the Bengal Legislative Council) suggests retaliation, and comments with satisfaction on the situation which has now arisen. The withdrawal of recognition, and the difficulty of getting into the colleges in England, have already, he says, led a large number of Indians to go to continental Europe. They will come back enamoured of continental instruments and appliances. India imports some two crores worth of stores of this kind. Can we not, he asked, withdraw our orders on British firms so long as the present attitude continues.

Bombay.

In Bombay, also, and doubtless elsewhere, the same spirit is manifest. In the Bombay Legislative Council an eminent physician recently tabled a motion for adjournment of the House to discuss the situation which had arisen owing to the decision of the General Medical Council, and one member remarked that there could only be one answer to the challenge: that was to call upon all students to give up any intention of proceeding to British universities and to urge the Secretary of State not to insist on British qualifications in future. Here, again, strong feeling was shown, and the motion was carried in spite of Government opposition. Another able and highly qualified medical man, who is head of the King Edward Memorial Hospital and associated medical college in Bombay, has spoken still more forcefully. He wishes the Government of India to issue orders against the recruitment for the medical services of the country of persons holding British qualifications only, and calls for other energetic retaliatory measures. Some of this talk is no doubt beside the mark, but some of the material results may be of a permanent nature. Meantime, as was pointed out in the Bombay Legislative Council, newly qualified Indians will be debarred from practising or prosecuting their studies further in Britain, and no Indian will be eligible for a commission in the I.M.S. unless he qualifies for registration in Britain—surely a remarkable introduction to dominion status.

Abortive Efforts at Compromise.

The universities which are concerned in this question of recognition fall into two categories. Bombay, Calcutta, Lucknow and Madras, and the Punjab University, have previously been recognised, while the comparatively new institutions of Patna and Rangoon have never been accepted for registration. Recognition of new schools is a matter requiring careful consideration, but in the case of those already recognised it seems to many inside and outside India unfortunate that the Council has not felt justified, in view of the very important interests involved—and even, perhaps, having some regard to the present difficult political situation—in tiding over this crisis without resorting to extreme measures. The correspondence laid on the table of the Assembly on March 20th shows that the Indian Government, although they had been favourably disposed to the proposal, eventually were forced to the conclusion that the appointment of the Commissioner of Medical Qualifications suggested by the British council was out of the question, owing to the strong opposition manifested both in the Assembly and outside it, and therefore put forward an alternative scheme, framed by a conference of universities, for the creation of a very authoritative board, consisting of representatives of the Government of India and the medical faculties, as a temporary measure, for determining and supervising medical qualifications and standards. The board was to have as president the Director-General of the Indian Medical Service, and was to appoint three inspectors, specialists in their own subjects (medicine, surgery, and midwifery), who would have reported to the board, which would then have decided whether a guarantee should or should not have been given to the British council as to whether the medical degrees concerned implied the minimum qualifications accepted for registration in Great Britain. It is possible to realise the difficulties under which the General Medical Council has laboured in dealing with India, and the captious nature of much of the comment which has been levelled at the Council by Indian critics, and yet to regret that on this occasion the Council did not exercise a little more patience, in view of the gravity of the issues involved, and the efforts which have already been made, in many quarters, to meet their requirements. Buildings have been enlarged, equipment improved, the curriculum revised (very much on the lines desired by the Council), clinical facilities have been extended, and the numbers of students, which had become excessive during and after the war, reduced to reasonable proportions. If all this is taken into consideration it does not appear that any great risk would have been run by continuing recognition provisionally, to meet a critical situation such as the present.

UNITED STATES OF AMERICA.

(FROM AN OCCASIONAL CORRESPONDENT.)

Medical Economics.

Mr. M. M. Davis, director for medical services of the Julius Rosenwald Fund and a well-known economist, computes that the actual outlay of the American public because of sickness is not far short of 3,000,000,000 dollars. This is exclusive of the cost of the sickness in lost time, disability, and premature death, which items would quadruple the bill. Three billion dollars is a large sum, but is less than the sum spent yearly on tobacco and sweets. Of the total he estimates that $625,000,000 is paid to private practitioners, whose average gross income is $4500. More money is spend on drugs and appliances than is paid in fees. It has been estimated on good authority that at least two-thirds of the money spent in this way is wasted. That much of the necessary expenditure can be cut down by preventive medicine is shown by the fact that there are still 150,000 cases of typhoid fever each year, costing in sickness bills and loss of wages not less than $35,000,000. But it is not really the amount of the sickness bill so much as the distribution of its burden which gives rise to complaint. About half of the total burden falls upon a sixth of the population. Moreover, doctors' bills are usually the most unexpected and least provided for. Instalment payments are a partial solution. Many banks now make arrangements to accept undertakings for monthly payment of bills and credit the whole to the physician at a discount which pays them for the trouble and risk of collection. Private and mutual insurance companies are also helping to some extent to spread the burden of payment more evenly.

Commonwealth Fund Report.

The annual report of the Commonwealth Fund announces an interesting departure in policy. Grants are to be made available for the establishment of general hospitals in rural sections of the country where at present medical aid can only be obtained, if at all, from a considerable distance. Scholarships are to be provided for medical students who intend

to practise in rural areas and Fellowships for rural physicians who wish to take post-graduate courses. Thirty-five Fellowships are offered to graduates of British universities who want to study in America. In the five years since these Fellowships were first offered 758 applications have been received and 115 Fellowships granted. Large sums have been made available for mental hygiene, and especially child guidance clinics, both in England and in the United States.

Syphilis in New Orleans.

A recent study in the Charity Hospital of Louisiana has revealed a remarkably high incidence of syphilis in the general hospital population of negro males. In the out-patient clinic of this hospital some 50 new cases are seen each week. About 300 consecutive cases were fully investigated both clinically and serologically, while some 200 others were investigated by serum examination only. The most conservative estimate shows an incidence of 35·5 per cent. with syphilis, while if uncorroborated +2 Kahn reactions are included the percentage rises to 49·5 per cent. Even the latter figure does not include cases clinically syphilitic but serologically negative or cases rendered serologically negative by treatment. The investigators conclude that the incidence of syphilis for negro males in New Orleans is higher than for any group, white or coloured, that has been investigated. Dr. Thomas Parran, jun., who recently left the Division of Venereal Diseases of the U.S. Public Health Service to become health commissioner of New York State, has estimated the incidence of venereal disease for the whole country as 8 per 1000 whites and 11 per 1000 coloured.

MEDICINE AND THE LAW.

Certification of Cause of Death: Coroner's Rebuke Withdrawn.

THE difficulty of understanding the law of death certification and registration was illustrated afresh last month. Section 20 of the Births and Deaths Registration Act of 1874 directs the Registrar-General to furnish all registrars with printed forms of certificates of cause of death; the registrars are to furnish these forms gratis to all registered medical practitioners residing or practising in their sub-districts. The section goes on to direct that, in case of the death of any person who has been attended during his last illness by a registered medical practitioner, the practitioner shall sign and give (to some person required by the Act to notify the death) a certificate stating to the best of his knowledge and belief the cause of death. This statutory duty was not altered when the law of births and deaths registration was altered in 1926, except that new provision was made for prescribing the forms, and that the registered medical practitioner on signing the certificate is now required to deliver it forthwith to the registrar and also to give written notice of the signing of the certificate to some person required by the Registration Acts to give information of the death. This 1926 alteration, it will be seen, does not affect the obligation on the attendant practitioner (under Section 20) to sign and give the certificate of cause of death. It was therefore not without surprise that doctors read of a rebuke administered by the South London coroner on April 7th to a practitioner who had merely discharged his statutory duty. Dr. James Manley, giving evidence at an inquest on that date upon the death of a licensed victualler at Clapham, stated that he had issued a certificate showing the cause of death to be alcoholism. From the newspaper report it appeared that he was somewhat sharply told by the coroner that he should not have done so, and must not do so again. A fortnight later the coroner withdrew the rebuke, admitting that he had overlooked Section 20 which has been the law since 1874. He took occasion, however, to criticise the law as "unfortunate," since the statute implied that in all cases, even murder, it is the duty of the practitioner to give a certificate which would be stopped by the registrar, thus causing delay and inconvenience. The coroner added that he thought it would always be wise for medical men issuing death certificates to notify the coroner of these cases which did not appear to be due to natural causes. The coroner can hardly have overlooked Part IX. of the code of consolidated Regulations of 1927, which provide the machinery by which the registrar refers such cases to the coroner before registration. As Parliament, the Registrar-General, and the Minister of Health have carefully prescribed the exact duties of the practitioner and the registrar, doctors will be well advised to comply with their statutory obligation as it stands rather than to concern themselves with alternative or supplementary duties under the law as it would be if improved.

Public Health Services.

SMALL-POX IN LEICESTER.

THE Health Committee of the Leicester Corporation reports that small-pox, which reappeared in the City during the last quarter of last year and succeeded in establishing itself, has further increased during the first quarter of the present year. The total number of cases reported by medical practitioners or discovered by the Health Department staff is 416 to date, a greater number than ever previously recorded. Fortunately, the disease has remained of the favourable type described in a previous report. The actual "illness" usually consists of a few days in bed, during which the symptoms closely resemble an attack of influenza. On appearance of the eruption, which in most cases is very sparse, the constitutional symptoms disappear, and the patients feel quite well again. They are then tempted to return to work, and if not under medical attendance they sometimes do so. The very mildness and triviality of so many cases has made it difficult to prevent the spread of the disease, as many cases continue to go about with the disease on them. Dr. Killick Millard, medical officer of health, believes that the present disease is a distinct variety of small-pox which breeds true, and if this is correct there is no danger of its giving rise to the severe and fatal kind of small-pox which formerly prevailed in this country. Of the 416 cases, 145 were under 16 years of age, 173 were between 16 and 30 years, and 98 were over 30 years of age; 189 were males and 227 were females. Of the cases over 30 years of age, 60 were females and 38 were males. This difference in sex is accounted for by the number of men in Leicester who were vaccinated whilst serving in the army during the war. With the exception of two doubtful cases last year, not one of the men who were vaccinated during the war has contracted the disease. The extra work thrown upon the staff of the Health Department by the outbreak has necessitated the appointment of a temporary assistant to the medical officer of health.

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED APRIL 19TH, 1930.

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 345 (last week 423); scarlet fever, 2022; diphtheria, 1246; enteric fever, 78; pneumonia, 1058; puerperal fever, 41; puerperal pyrexia, 82; cerebro-spinal fever, 12; acute poliomyelitis, 5; acute polio-encephalitis, 1; encephalitis lethargica, 10; dysentery, 5; ophthalmia neonatorum, 97. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the Metropolitan Asylums Board on April 22nd–23rd was as follows: Small-pox, 542 under treatment, 26 under observation (last week 560 and 31 respectively); scarlet fever, 2060; diphtheria, 2669; enteric fever, 27; measles, 1103; whooping-cough, 61; puerperal fever, 28 (plus 19 babies); encephalitis lethargica, 120; poliomyelitis, 1; "other diseases," 23. At St. Margaret's Hospital there were 17 babies (plus 9 mothers) with ophthalmia neonatorum.

Deaths.—In the aggregate of great towns, including London, there was one death from small-pox, 5 (1) from enteric fever, 116 (57) from measles, 7 (1) from scarlet fever, 30 (5) from whooping-cough, 44 (5) from diphtheria, 44 (11) from diarrhœa and enteritis under two years, and 42 (6) from influenza. The figures in parentheses are those for London itself.

The death provisionally classified to small-pox was assigned to Stepney (Metropolitan Borough). The deaths from enteric fever outside London were reported from Edmonton, Ashton-under-Lyne, Sunderland, and Tynemouth. Fatal cases of measles were widely distributed, with larger numbers at Salford 7, Liverpool 6, Middlesbrough 6 (Glasgow reported 13). Whooping-cough claimed 4 victims at Birmingham, 3 each at Bradford and Middlesbrough. Four deaths were attributed to influenza at Manchester.

The number of stillbirths notified during the week was 260 (corresponding to a rate of 42 per 1000 births), including 50 in London.

FATAL CASES OF SMALL-POX.

The fatal case of small-pox reported in last week's return from Leeds was that of a woman, aged 77 years, who had been some time in the infirm ward of St. James's Hospital. Dr. J. Johnstone Jervis, medical officer of health, tells us that the primary cause of death was "cerebral hæmorrhage," and the secondary, "variola." "It was," he adds, "unfortunate that the disease was introduced into this hospital, and especially amongst the old people, because some of them are very infirm and unable to resist acute infection of any sort. So far that has been the only death."

The death in Camberwell was that of a female infant, aged 9 months, whose certified cause of death, Dr. H. W. Barnes informs us, was: (*a*) bronchial pneumonia; (*b*) pertussis; (*c*) small-pox (not vaccinated). No post-mortem examination.

In this week's return the fatal case is that of a woman of 47, the widow of a crane-driver at the docks. The date of onset was April 3rd, the rash appeared on the 5th, when she was removed to Joyce Green Hospital, where she died on the 12th. We learn from Dr. J. M. Browne, acting medical officer of health, that the death return was filled up thus: 1. (*a*) Myocarditis; (*b*) cerebral thrombosis. 2. Small-pox (vaccinated in infancy); no p.-m.

ROYAL MEDICAL BENEVOLENT FUND.—At a recent meeting of the Committee, 45 grants were made, amounting to £973 10*s*. The following were some of the cases helped:—

M.B., aged 31. Started in general practice three months ago. She did not buy a practice but put up a plate. She spent her last penny in fitting up the surgery, the rent having been guaranteed by friends for a time. All went well and the practice increased, but she has broken down in health and is suffering from tuberculosis of the lungs. Sanatorium treatment is necessary and financial help was asked for. Fund voted £26 to be paid in two instalments during the next six months, when the case will be reconsidered.

M.D., aged 25. She has held four resident hospital appointments since qualifying. She is now suffering from pulmonary tuberculosis, complicated by tuberculous laryngitis. Fund voted £20. Further consideration will be given.

M.B., aged 43, married. Has been suffering from diabetes mellitus since 1927. Pulmonary tuberculosis was diagnosed in April, 1929. In the past it is known that he gave his services in the cause of charity, and has seen patients on the books of this Fund on request. Fund voted £52 over a period of six months.

Widow, aged 38, of M.B. Husband served in R.A.M.C. till 1920. He then went abroad as medical officer to a railway. After a short illness he died of pneumonia at the age of 37. The widow is left without means, and has a boy of 7 to educate. Fund gave an emergency grant of £5 immediately, and a further grant of £26, payable during the next six months. The R.M.B.F. Guild will also give help towards the education of the boy.

Widow, aged 41, of M.B. Husband died recently of tuberculosis at the age of 40, leaving his widow practically penniless, with a boy of 5 to educate. Fund voted a grant of £26 and special gift of £10.

Subscriptions and donations are very urgently needed in order that the activities of the Fund may be continued and applicants given the help they need. Cheques should be forwarded to the Hon. Treasurer of the Fund at 11, Chandos-street, London, W. 1.

Correspondence.

"Audi alteram partem."

A UNIVERSITY DEGREE FOR THE GENERAL PRACTITIONER.

To the Editor of THE LANCET.

SIR,—London and her University are becoming more and more the centre of learning in the Empire, attracting students and post-graduate students from all parts of the Empire, and, indeed, from the other countries too. With the establishment in London, at the Hammersmith Hospital, of a great Empire post-graduate hospital and medical school, connected with the University of London, will come the necessity for that university to carefully review the present regulations under which her medical degrees are obtainable, and to revise them, so that they are no longer preserved as stem-ginger in sealed jars, but are thrown open to students from all over the world upon reasonable conditions.

Your correspondent, "M.D., M.R.C.P.," has touched upon the one point which requires immediate attention and, as he rightly points out, the class most urgently in need of consideration is that of the qualified and duly registered medical practitioner. No doubt 90 per cent. of medical men and women are general practitioners, yet the regulations are drawn up and guarded by the other 10 per cent. of hospital specialists and academic professional gentlemen out of touch with our needs. A reputable M.D. degree should be available upon reasonable terms in this country for every duly registered general practitioner of 30 years of age and seven years' practice. It is this degree, an M.D. degree in general medicine for general practitioners, which should be established by the University of London and made available, after a period of post-graduate study, for students from all over the world. With the establishment of this great central post-graduate institution it will be incumbent upon the University of London to exercise more imagination than has been done in the past, to take a broader and a wider view, to become less academic but more practical, and having had a share in providing the facilities for post-graduate instruction, to provide at the same time the necessary hall-marks of that study when undertaken.—I am, Sir, yours faithfully,

CHARLES A. H. FRANKLIN, M.D.,
April 26th, 1930. General Practitioner.

TONSILLECTOMY BY DIATHERMY.

To the Editor of THE LANCET.

SIR,—In your issue of April 19th (p. 859) Dr. Warner Collins describes the successful removal of tonsils by diathermy. I have used this method myself in cases where the patient for some reason could not have the tonsils dissected out. But I think it will be agreed that it should not be used in preference to a *complete* dissection, since it may leave behind scarred and infective lymphoid tissue, or even deep pus, as in other methods. Tonsils are easily removed by dissection under a local anæsthetic in an adult at one sitting. The operation is as easy as under a general anæsthetic, and the recovery at the finish of the operation is more comfortable for the patient and the nursing staff. Many patients in this country are averse to local anæsthesia. Nevertheless, if there is no recent acute infection, nor dental sepsis, if the dissection is done without roughness and with a preservation of the mucous membrane from the surface of the tonsils, and if the fossæ are kept clean by gargling and cleansing with hydrogen peroxide little discomfort will result, and certainly no malodorous slough or secondary hæmorrhage.

Diathermy used with a fine tool is very useful for severing the vessels that enter the capsule as the tonsil is being dislocated during the dissection.

I am, Sir, yours faithfully,

C. HAMBLEN THOMAS, F.R.C.S.

Harley-street, W., April 23rd, 1930.

THE STETHOSCOPE IN THE DIAGNOSIS OF PULMONARY TUBERCULOSIS.

To the Editor of the LANCET.

SIR,—In the LANCET of April 19th (p. 872) there is a reference to some remarks by Dr. J. Gravesen, of Vejlefjord, on the lack of usefulness of the stethoscope in the diagnosing of pulmonary tuberculosis. All sanatorium physicians of experience must have been aware of this for some years; indeed, the more attempts which have been made to establish a diagnosis of this condition without the consideration of symptoms the later has the disease been discovered, and such methods as looking for tubercle bacilli, though still insisted on in some quarters, are really a policy of despair. Even the X ray method is not reliable, as was recently shown by Dr. F. G. Chandler in your own columns,[1] where he tells us of a case with hæmoptysis together with the finding of tubercle bacilli in the sputum in which the X ray picture was normal. It should be remembered that there are X ray pictures and X ray pictures; there are also interpretations and interpretations of the same, with the result that a patient may be put to both unnecessary expense and unnecessary danger through having to leave his bed when he may be suffering from symptoms indicating activity of disease, perhaps to travel a considerable distance and at the end to be told (quite incorrectly) that he has nothing the matter with him, although he himself is feeling desperately ill. The advantage of considering symptoms is that by their means it may be possible to come to a diagnosis; at the same time it is from symptoms that we are able to decide, whatever the physical findings may be, the urgency or otherwise of treatment. A rectal temperature measurement is a great assistance in diagnosis and essential for treatment. When there are few physical signs combined with symptoms of toxæmia then the prognosis is grave.

I have no doubt that pulmonary tuberculosis has changed very considerably in the last 30 years. As a serious affection it seems to be dying out. In Ayrshire the number of deaths registered in one year as due to pulmonary tuberculosis has fallen to 126 out of a population of 300,000. As we admit to this sanatorium about 220 cases a year and have other beds elsewhere to the number of about 60, it would appear that the disease is well in hand. Nevertheless, at the present moment I have a waiting list of about 30.

I am, Sir, yours faithfully,

EDWARD E. PREST.

Ayrshire Sanatorium, New Cumnock, April 26th, 1930.

[1] THE LANCET, March 15th, p. 588.

BRADFORD ROYAL INFIRMARY.—In 1929 there were 7953 casualty patients, and 49,712 treatments in the massage and remedial exercises department, an increase of more than 4000. The average weekly cost of each in-patient (3845) was £2 15*s.* 1*d.*, a merely fractional increase. They stayed on the average 22·5 days.

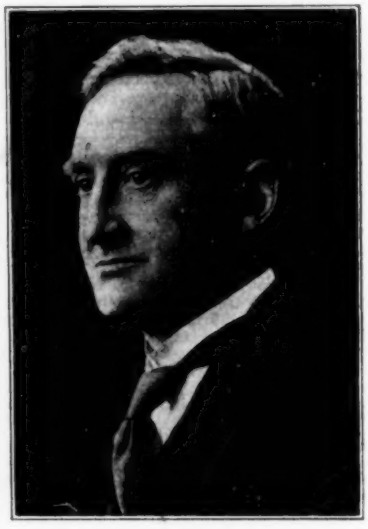
LANDSCAPES IN A HOSPITAL WARD.—An extension of Kingston-on-Thames Victoria Hospital was opened recently by Mrs. Leonard Bentall, whose husband has contributed extensively to the work, which has cost £13,000. The enlargements include a children's ward of nine cots—children have hitherto occupied adult wards—and nine private wards (10 beds), for paying patients. The walls and ceiling of the children's ward are painted with landscapes combining water, hills, and woodlands—a decoration which is said to be unique in an English hospital.

Obituary.

FREDERICK EDWARD WYNNE, B.A., M.B. DUB., D.P.H.

Dr. F. E. Wynne, whose death on April 22nd was recorded in our last issue, had only been ill for a few days, and his death at 56 years of age cuts short a career of unusual value in the service of public health.

Frederick Wynne was born at Kilkenny in 1870, fourth son of the Rt. Rev. F. R. Wynne, D.D., Bishop of Killaloe, and followed his elder brother, John Darley, to Trinity College, Dublin, where both graduated in arts and medicine, the younger in 1894. His course was distinguished, for he took the Hudson scholarship and was gold medallist at Adelaide Hospital, where he later served for a time as resident officer, and he was hon. secretary of the University Biological Society. After further experience at the Rotunda Hospital he migrated in 1896 to Leigh, in Lancashire, where he started in practice and held the position of hon. surgeon to the local infirmary. General practice obviously did not give him the scope he desired, for from his student days he was a fluent and persuasive speaker, of great versatility in debate, and he began to be conscious of gifts of propaganda and organisation which would have readier outlet in public service. In 1909 he was appointed first full-time medical officer for Leigh, and three years later went on to Wigan, where he remained throughout the period of the war until in 1921 the opportunity offered of succeeding Dr. Scurfield as medical officer of health for Sheffield. At Wigan he combined the duties of medical officer of health, tuberculosis officer, chief school medical officer, and superintendent of the infectious diseases hospital, and when he left he was engaged in establishing a further hospital of 72 beds for the treatment of tuberculosis. It was at his instigation that the Wigan Corporation maintained its own herd of milch kine. As soon as war broke out in 1914 Dr. Wynne obtained a commission in the R.A.M.C., and was detailed for service in Egypt, where he became divisional sanitary officer to the Expeditionary Force.



DR. F. E. WYNNE.

[*Photograph by Lafayette.*

For the remaining nine years of his life he impressed his personality on the sanitary services of Sheffield. Open-air life and freedom to breathe and live properly never had a stronger advocate. Schemes of clearance and rehousing always had his warm support, and his interest extended to such minutiæ as the paving of yards and courts, and to the small amenities which determine the hygienic life of a community. His name soon became well known in the city, for he was not only frank and outspoken but wilfully put

his teaching into provocative form and revelled in the appearance of heterodoxy. At regular intervals he hurled what he called medical bombshells which continued to crackle for weeks at a time in the columns of the local press. He was equally uncompromising in professional circles, as in an address given at Glasgow in 1922 when he supported the thesis that the tax- and rate-payer is being bled by expenditure which produces no adequate return in improved health and prolonged life. In the following year at Hull he asked: "Should infant mortality be reduced?" not mincing words in condemning sentimental propaganda in favour of unlimited production of babies. Nevertheless he concluded with the admission that a reduced rate of infant mortality may itself prove a factor in bringing about the desired reduction in the birth-rate. No doubt his public work was coloured by his views on democracy, for, though geniality and kindness itself in all personal relations, he was an aristocrat at heart, and held to the paramount value of heredity and the permanence of sound germ-plasm.

Wynne's literary urge took him early, for when barely qualified he contributed "The Blacklegs of the Jerry Pit" to *Chapman's Magazine*, soon followed by "A Conversion and Its Sequel." While still at Leigh he wrote his first two novels, "Faith Unfaithful" and "Fortune's Fool"; a play called "Subsidence," full of local colour, was produced at the Gaiety Theatre in Manchester. "Mediterranean Mystery" was perhaps his best work of fiction, but "Digby's Miracle," which appeared in 1924, could only have been written by a medical man, for it tells of a village practitioner, by training and inclination an experimental physiologist, whose special knowledge finds limited scope until it enables him to organise a miracle by restoring sight to an hysterical girl through the curative waters of an old well. His easy exposition found play in a scholarly little book on "Ductless and Other Glands," embodying the results of endocrine research, and recording his own view that old age might be as physiological a period as any other, and probably no less pleasant, if youth and maturity were rightly used. He wrote many articles on public health subjects for the press, and was for many years a medical correspondent of the *Manchester Guardian*.

Dr. Wynne held many offices. He was professor of public health in the University of Sheffield, a member of the Senate, and presided for some time over the north-western section of the Society of Medical Officers of Health. Only recently he laid down the position of hon. pathologist and bacteriologist to the Wigan Infirmary.

He leaves a widow and three sons.

SHEFFIELD ROYAL INFIRMARY.—The annual report states that the annual cost per patient in 1929 was £147 6*s*. 2*d*., an increase of £6 3*s*., but that at £6 14*s*. 7*d*. the cost of each in-patient fell by 11*s*. 1*d*. Out-patients cost 4*s*. 6*d*. each, a reduction of 7*d*. In the Godfrey Walker convalescent home each in-patient cost £81 15*s*. 2*d*., an increase of £1 16*s*. 3*d*. Close coöperation between the Sheffield municipal and voluntary hospitals has been assured by the creation of a joint advisory committee composed of lay and medical representatives of each.

DONATIONS AND BEQUESTS.—Mrs. Sophia Longley, of Lydhurst-avenue, Streatham-hill, S.W., left £500 each to Guy's Hospital, St. Thomas's Hospital, and St. Bartholomew's Hospital.—Mr. George Bridcut of Yew Tree House, Ombersley, Worcestershire, left 1000 guineas each to Middlesex Hospital and the Worcester Infirmary.—Mr. J. F. W. Deacon, J.P., hon. treasurer of the London Lock Hospital and Home, has made a donation of £500 to its funds, and The Worshipful Company of Goldsmiths had made a grant of £200 to this institution. The following legacies have been bequeathed to the institution: £100 from the late Mr. George Toller, and £10 from the late Mr. Henry Kruger, of Liverpool.—Sir William Milligan, M.D., LL.D., of Westbourne, Rusholme, Manchester, who left unsettled property of the value of £293,470, bequeathed his medical library to the University of Aberdeen.

Medical News.

ROYAL COLLEGE OF PHYSICIANS OF LONDON.—At an ordinary quarterly Comitia of the College held on April 24th, with Sir John Rose Bradford, the president, in the chair, the following members of the College were elected to the Fellowship:—

Ralph Henry Crowley, Charles Hunter, Leonard George Joseph Mackey, Edward Burton Gunson, William Wilson Jameson, Arthur John Scott Pinchin, Adolphe Abrahams, Alan Worsley Holmes à Court, Thomas Archibald Malloch, Arthur Peregrine Thomson, Graham Selby Wilson, Henry Wallace Jones, James Calvert Spence, William Brown, Archibald Edmund Clark-Kennedy, Hugh Reginald Dutton, James Purdon Martin, Macdonald Critchley, and Arthur Salusbury MacNalty.

The following were nominated by the Council under By-law XXXVIII (b):—

Walter Ernest Dixon, John James Rickard Macleod.

The following candidates were admitted Members of the College:—

Anthony Dominic Abdullah, Edward William Anderson, Lennox Gordon Bell, Charles Allan Birch, Edward John Cronin, John Nathaniel Cumings, Amar Nath Duggal, John Lawrence Howland Easton, Phyllis Victoria Lillia Epps, Florence Margaret Gamble, Stanley Jack Hartfall, Albert Joseph Hawe, Catherine Mary Hext, Thomas Alexander Alfred Hunter, Simon Kin, Isabella Louise Hamilton Livingstone, Murdo Mackenzie, Lucy Margaret Theodora Masterman, Swithin Pinder Meadows, Thomas Morton, George White Pickering, Max Michael Posel, Charles Frank Shelton, William Arklay Steel, Arthur Goronwy Watkins, and Henry Yellowlees.

Sir John Rose Bradford was appointed to represent the College at the Jubilee Celebrations at the University of Manchester on May 23rd.—By a resolution of the College the President was asked to convey a vote of condolence to the family of the late Poet Laureate, Robert Bridges, O.M., who was a Fellow of the College.

It was reported that with the concurrence of the President the Medical Department of the Admiralty have awarded the Gilbert Blane Gold Medal for 1930 to Surg.-Lieut. Commander J. F. H. Gaussen.

Dr. R. A. Young was appointed Representative of the College at the Sixteenth Annual Congress of the National Association for the Prevention of Tuberculosis to be held July 3rd to 5th.—Dr. William Hunter was appointed to represent the College on a Committee of the People's League of Health to consider the Cause and Eradication of Bovine Tuberculosis.

Licences to practise were conferred upon 142 candidates (124 men and 18 women) who have passed the Final Examination in Medicine, Surgery, and Midwifery of the Conjoint Board and have complied with the by-laws of the College. The following are the names and medical schools of the successful candidates:—

M. Ata Ullah, Punjab and Charing Cross; H. B. Bagshaw, Cambridge and London; G. N. Bailey, Cambridge and St. Thomas's; A. H. Baker, Manchester; J. E. G. Baker, London; A. N. Barker and F. Bartholomew, St. Thomas's; G. R. Bashford, Birmingham; D. A. Beattie, St. Bart.'s; D. H. Bolton, St. Thomas's; A. E. Bowling, Leeds; Mabel Brewster, Royal Free; R. O. Brooks, Manchester; C. C. Bryson, Cambridge and Middlesex; A. Burkhardt, Univ. Coll.; C. E. Burridge, Birmingham; G. G. Cameron, Guy's; S. N. Chopra, Punjab, Edinburgh, and Middlesex; D. S. Chowdhary, Punjab and London; J. F. Coates, Bristol; A. F. H. Coke, St. Mary's; Charlotte A. G. Conway, Royal Free; J. H. Conyers, Cambridge and St. Thomas's; Margaret E. Cook, Royal Free; H. Coorland, St. Bart.'s; H. D. Cronyn, St. Mary's; H. Curtis, Cambridge and St. Thomas's; A. L. d'Abreu, Birmingham; C. M. Dell, St. Thomas's; W. J. D'Rosario, Madras and Guy's; P. G. Dowdell, Univ. Coll.; J. C. E. Dusseau, Toronto; J. J. Eapen, Madras and Birmingham; R. E. M. Fawcett, St. Bart.'s; Sheila J. Ferguson, King's Coll.; F. H. H. Finlaison, R. H. Fish, and E. D. Forster, Cambridge and St. Thomas's; E. V. Frederick, St. Bart.'s; J. D. J. Freeman, St. Thomas's; W. W. Gerrard, Liverpool; P. R. Graves, St. Thomas's; S. R. Gunewardene, Ceylon and Univ. Coll.; H. C. Halge, Madras and St. Mary's; C. J. K. Hamilton, Cambridge and Liverpool; D. Hay, Cambridge and St. Bart.'s; Geraldine J. G. Hayes, Manchester; Columba M. D. Heathcote, Charing Cross; J. Henry, Leeds; J. R. Hindmarsh, Durham; Cicely L. Hingston and S. W. Holmes, St. Mary's; Ethel E. Hopper, Charing Cross; L. H. Howells, London; K. N. Irvine, Oxford and St. Thomas's; O. Ive, Guy's; L. A. Jacob, Madras and St. Thomas's; M. M. St. G. Johnstone, Cambridge and St. Thomas's; E. G. M. Jones, Univ. Coll.; C. Jotikasthira, St. Thomas's; C. C. Kapila, Rangoon and Charing Cross; N. F. Kendall, St. Bart.'s; J. D. Kershaw, Univ. Coll.; S. Lal, Punjab and Middlesex; F. P. L. Lander, Middlesex; Grace Law, King's Coll.; R. H. Leaver, St. Bart.'s; E. Z. Levy, Manchester; G. S. R. Little, St. Bart.'s; J. B. Lloyd, London; H. Lwow, Vienna and St. George's; H. G. McComas, Guy's; S. McDonald, Cambridge and Durham; W. McKissock, St. George's;

R. W. Malim, Cambridge and St. Thomas's; Margery L. Maltby, Royal Free; M. Mandelstam, Oxford and St. Bart.'s; R. S. Mann, Cambridge and Univ. Coll.; C. E. P. Markby, Cambridge and St. Thomas's; J. H. G. Mason, Middlesex; C. B. Melville, Melbourne and Guy's; J. B. S. Morgan, Cardiff and St. Bart.'s; F. Murray, London; F. J. Napier, Guy's; Alonzo M. Nodine and A. M. Nussbrecher, Middlesex; R. Nutt, Oxford and St. Thomas's; C. L. Oakley, Univ. Coll.; G. L. Ormerod, Cambridge and St. Thomas's; M. Owen, Cardiff and Univ. Coll.; P. M. Oxley, St. Bart.'s; C. H. Pauli, Bristol; D. D. Payne, St. Thomas's; M. Phillips, London; F. E. Pilkington, Cambridge and King's Coll.; J. R. F. Popplewell, Guy's; J. O. Poynton, Cambridge and Charing Cross; A. C. Price, Guy's; S. Ramadas, Bombay and St. George's; S. Ramanathan, Ceylon and King's Coll.; G. E. Ranawake, Ceylon and Middlesex; J. M. Reese, St. Mary's; J. I. Rerrie and A. H. T. Robb-Smith, St. Bart.'s; H. E. W. Roberton, Cambridge and St. Bart.'s; C. G. Roberts, Cambridge and Westminster; Victoria M. Robinson, Oxford and King's Coll.; J. D. Rose, Durham; Pattie E. Rose, Royal Free and St. Mary's; K. M. Ross, St. Bart.'s; C. A. Rumball, Guy's; J. Sakula, Middlesex; K. T. Samatapala, Ceylon and King's Coll.; S. Scher, Cape and Univ. Coll.; L. Seaton, Leeds; K. M. Seedat, Bombay and Charing Cross; M. H. Shah, Punjab and Univ. Coll.; Ursula Shelley, Royal Free; Edna F. Sheridan, King's Coll.; L. Silman and S. Silman, Leeds; Phyllis F. L. Simon, Royal Free; J. G. Sleigh, Cambridge and King's Coll.; Edith M. P. Smith, Cambridge and Charing Cross; P. Somasunder, Madras and London; B. Southwell, Guy's; G. H. G. Southwell-Sander, Cambridge and St. Thomas's; T. M. Spilhaus, St. Thomas's; J. K. Stanger, Durham; R. W. Stephenson, Guy's; B. P. Sur, Calcutta and Edinburgh; F. H. Taylor, Durham; G. Taylor, Manchester; J. N. Vasudeva, Punjab and St. Thomas's; L. H. Wharton, Bristol; J. C. G. Whitelaw, Cambridge and St. Thomas's; D. A. Williams, Cardiff and Univ. Coll.; Rose E. Williams, Royal Free; F. S. Winton, Cambridge and St. George's; Joyce R. Woods, Royal Free; G. R. H. Wrangham, St. Mary's; and W. Young, Cardiff and St. Mary's.

SOCIETY OF APOTHECARIES OF LONDON.—At recent examinations the following candidates were successful:

Surgery.—R. P. Davies, Cardiff and London Hosp.; M. Halperine, Paris and London Hosp.; J. E. R. Heppolette and C. G. Muller, St. Mary's Hosp.; E. G. Nair, Manchester; and L. J. Pearson, Birmingham.

Medicine.—J. Britanischski, London Hosp.

Forensic Medicine.—J. S. Bury, Manchester; H. Glynn, Charing Cross Hosp.; J. M. L. Love, St. Mary's Hosp.; and A. W. B. Wiggins, Sheffield.

Midwifery.—E. C. Dymond and C. Seeley, St. Mary's Hosp.; G. R. Germany, Sheffield; E. G. Nair, Manchester; and G. Wilsker, Leige and Royal Free Hosp.

The Diploma of the Society was granted to the following candidates, entitling them to practise Medicine, Surgery, and Midwifery:—J. S. Bury, E. G. Nair, and L. J. Pearson.

UNIVERSITY OF LONDON.—At recent examinations the following candidates were successful:—

D.P.M.

With Special Knowledge of Mental Deficiency.—C. J. C. Earl.
With Special Knowledge of Psychiatry.—Beryl Senneck.

University College.—The six lectures on Special Sense Physiology, to be given by Dr. R. J. Lythgoe, will be at 5 P.M. on May 15th, 20th, 22nd, 27th, and 29th, and on June 3rd. Those by Prof. F. G. Cole, F.R.S., on the Early History of Generation and Comparative Anatomy will be at 5.30 P.M. on May 7th, 8th, 14th, 15th, 21st, and 22nd. Dr. W. E. Blatz, assistant professor of psychology in the University of Toronto, will deliver a lecture on Modern Theories in Habit Training in the Pre-School Child, on Tuesday, May 13th, at 5.30 P.M.

BRITISH INSTITUTE OF RADIOLOGY.—The annual general meeting of this institute (incorporated with the Rontgen Society) will be held at 32, Welbeck-street, London, W., at 8.30 P.M., on Thursday, May 15th. Dr. Peter Kerley will read a paper on the Pathology of Early Pulmonary Tuberculosis as revealed by X rays. On the following morning provincial members are invited to visit the Westminster Hospital Annexe (Radium) 66, Fitzjohn's-avenue, Hampstead, N.W.

LONDON AND COUNTIES MEDICAL PROTECTION SOCIETY.—The annual general meeting of this Society was held at Victory House, Leicester-square, on Wednesday last, April 30th, Sir John Rose Bradford, the president of the Society, being in the chair. In moving the reception of the annual report Sir John pointed to the increasing adherence of the profession to the Society, nearly a thousand new members having been elected during the year, while the large sums of money paid in defending and maintaining the interests of the members was proving the absolute necessity of organisation for protecting medical men from many of the risks associated with professional life. The annual report, statement of accounts, and balance sheet having been received and adopted, the president and the principal officers were unaminously re-elected for the ensuing year.

NAVAL MEDICAL COMPASSIONATE FUND.—At the quarterly meeting of the Directors of this Fund on April 24th the sum of £180 was distributed among the several applicants.

SOCIETY OF RADIOGRAPHERS.—At a meeting of this society to be held at 32, Welbeck-street, London, W., at 7 P.M. on Wednesday, May 14th, Mr. C. H. Holbeach will read a paper on the Planning of an X Ray Department.

INVALID CHILDREN'S AID ASSOCIATION.—The annual meeting of this association will be held at 18, Carlton House Terrace, on Tuesday, May 6th, at 3 P.M., with Viscount Goschen in the chair. Among the speakers will be Dr. F. E. Fremantle, M.P., and Sir Charters Symonds. Admission is by ticket only, and the Secretary's address is 117, Piccadilly, W. 1.

RETIREMENT OF MR. E. W. MORRIS.—It is announced that Mr. E. W. Morris, House Governor of the London Hospital, will retire from that position in July next. Mr. Morris, who has been House Governor since 1903, is the author of "A History of the London Hospital."

WALSALL ISOLATION HOSPITAL.—The Mayor of Walsall has formally opened the first portion of a new isolation hospital for the county borough at Goscote, a short distance from the town. The building, which is to cost £30,000, contains a block of 34 beds for scarlet fever and diphtheria, and a block of ten beds for mixed isolation cases. There will eventually be 100 beds.

CONTRIBUTORY SCHEMES IN YORKSHIRE.—The Yorkshire voluntary hospitals committee has approved of a proposal that every hospital in the county should have a scheme of regular contributions, framed according to the conditions of the district, patients to be entitled to full privileges in any hospital, irrespective of whether it is that to which they contribute.

NORFOLK AND NORWICH HOSPITAL.—Since the war the number of beds has been nearly doubled, and several additions have been made to specialist departments, but the accommodation for a greatly increased nursing staff has not been increased for nearly 30 years. Unless the accommodation is augmented it will be impossible to provide nurses for the new eye, ear and throat ward now being erected. It has, therefore, been decided to appeal for £40,000 for the extension of the nurses' home. The people of Norfolk subscribe to the hospital at the rate of nearly two shillings per head of the entire population.

HOSPITAL ACCOMMODATION AT PLYMOUTH.—Mr. Arthur Greenwood, the Minister of Health, on April 12th, laid the foundation-stone of an extension of the Plymouth Mental Hospital at Blackadon, and of new nurses' quarters at Swilly Hospital. The work at Blackadon is part of a scheme of extension which, when completed, will cost £129,000 and accommodate 839 patients. At present the mental hospital, which contains an average of 515 patients, is overcrowded to the extent of 76 patients, while a further 162 are boarded out.

PRINCESS ALICE HOSPITAL, EASTBOURNE.—At the annual meeting of this hospital it was stated that although there had been another big increase in the number of in-patients, the governors thought it inadvisable to venture on any scheme of enlargement until time had elapsed in which to gain experience of the working of the Local Government Act. This also applied to a contributory scheme and nurses' superannuation. The year's finances showed an increase of ordinary expenditure over ordinary income of £993, despite great attention to economy. The governors decided that legacies should not, in future, be consumed in paying off deficit, but invested to provide an annual income.

THE NEW SUSSEX HOSPITAL.—A year of steady growth and improvement was reported at the annual meeting on April 2nd of the New Sussex Hospital for Women and Children at Brighton. The 12 months' working marked a deficit of £214, and a total overdraft (including this sum) of £614 at the bank; but it was pointed out that but for the adoption of the federated superannuation scheme for nurses, and the trebling of the rate demand under the new assessment, the expenses would have been met. A special appeal is to be launched to meet the deficit; also for a considerable sum to cover urgent repairs. During 1929 a new wing was in full occupation, an additional department had been opened, and the number of patients set up a fresh record. The demands upon the out-patient, X ray and massage departments, and the dispensary, were far in excess of the accommodation, and the governors, it was stated, were considering plans for the necessary extension. The hospital is staffed by medical women.

LEAGUE FOR SEXUAL REFORM.—The fourth congress of the World League for Sexual Reform on a Scientific Basis will be held at Vienna from Sept. 13th to 20th.

SOCIETY OF MEDICAL OFFICERS OF HEALTH.—The annual provincial meeting will be held at Harrogate at 4 P.M. on May 16th, when a discussion will be held on Rheumatism in its Public Health Aspects. In the evening the members will be entertained at dinner by the Mayor and Corporation. Those who intend to be present are asked to notify the Executive Secretary at 1, Upper Montague-street, W.C.1, at once.

NATIVE PRACTITIONER IN DURBAN.—A Natal correspondent informs us that Dr. I. B. Gumede, who has graduated at Birmingham and has returned to practise in South Africa, is the first practitioner that the natives of Natal and Zululand have produced since the death of Dr. Nembula, over 30 years ago. Before coming to England he was educated at the South African Native College at Fort Hare, Cape Province.

A LONDON HOSPITAL SHELTER.—An ornamental shelter erected over the paths in the main quadrangle of the London Hospital, at the charge of Sir William Paulin, was formally inaugurated last week. It consists of teak-columns and beams supporting a copper-covered roof, and provides a sheltered way from the wards to the nurses' quarters. The local authorities made it a condition that means must be devised to admit a fire-engine or fire-escape, and the roof is therefore made to open in bascule fashion.

HOSPITAL FIRES.—The central wing of Antrim Mental Hospital (600 patients) has been almost completely destroyed by a fire which began at 10 o'clock at night and is supposed to have been caused by an overheated kitchen flue. Wards nearest to the seat of the fire contained 300 patients, who had to be removed, together with 60 infirm inmates, to safer quarters. The dining hall, recreation hall, and much of the domestic quarters were gutted, and the damage is estimated at £50,000.—A fire, the origin of which has not been ascertained, broke out in the roof of James Murray's Royal Asylum at Perth, and, although it was localised, much damage was done. Most of the patients were in the grounds, and the 26 who were in the building were removed by Dr. W. D. Chambers, the Medical Superintendent, and the nurses before the arrival of the fire brigade.—The Edward Cox Memorial Cottage Hospital, at Meigle, in Perthshire, was almost entirely destroyed on April 15th by a fire which originated in an attic. There were only three patients, who were safely removed; the caretaker's house, kitchen, and laundry alone were saved. The loss, which is estimated at £20,000, would have been much less serious but for the lack of water, over a mile of hose having to be laid across fields and a main road by the Dundee Fire Brigade to tap Meigle Burn.

Parliamentary Intelligence.

NOTES ON CURRENT TOPICS.

REASSEMBLY AFTER EASTER.

BOTH Houses of Parliament reassembled on Tuesday, April 29th, after the Easter recess.

MINISTRY OF HEALTH VOTE.

On Tuesday, April 29th, the House went into Committee of Supply on the Civil Service estimates. Mr. ROBERT YOUNG was in the chair.

On a vote of £12,724,200 for the salaries and expenses of the Ministry of Health, Mr. A. GREENWOOD (Minister of Health) said that the total amount of the estimate was a little over £2,000,000 less than that for last year. The decrease was accounted for primarily by the discontinuance of certain public health grants as from April 1st this year. Administrative charges showed an increase of £190,000. Dealing with the general housing position the right hon. gentleman said that up to March 31st this year there had been completed since the Armistice in connexion with State-aided schemes of housing 939,000 houses. In addition, private building without Government assistance accounted for 520,000 houses, so that since the end of the war the total number of houses completed in England and Wales amounted to 1,459,000. Of the houses built with State assistance, 527,000 were built by local authorities. Slum clearance had proceeded slowly partly because of the present state of the law, and partly because of the legal decision given in the courts some little time ago, reinforced by another decision given quite recently, and the Housing Bill now before Parliament would meet that situation. Since the war the State had expended, up to the end of March this year, £85,000,000 on housing. Referring to the progress of town-planning, Mr. Greenwood said that there were now 80 regional planning committees, 60 of which were advisory and 20 executive. Substantial progress had been made in town-planning in the course of the year At present town-planning schemes were in operation, or proposed, covering in England and Wales at March 31st this year over 5,417,000 acres compared with 4,450,000 acres a year ago. Dealing with the transfer of functions under the new Local Government Act, the right hon. gentleman said that a number of local authorities had straight away appropriated individual institutions for the purposes of the Public Health Acts, and in such cases these institutions would cease to be poor-law institutions and would come under the administration of the committee of the council concerned with the special services for which this scheme was established. But if the council wished to supplement it by the use of other poor-law accommodation it could do so. This process of appropriating institutions, he imagined, would develop in course of time. Forty-eight out of 62 counties and 75 out of 83 county boroughs had preferred to set up an ad hoc committee as a separate public assistance committee. Forty-two county schemes and 52 county borough schemes provided for the inclusion of coöpted members. It was gratifying to know that 16 county councils and 49 county boroughs had found it possible to make an immediate declaration on their schemes that certain poor-law services for which parallel provision had been made under special Acts of Parliament should be treated exclusively under those Acts and not by way of poor-law relief. One hoped that as the new authorities became more familiar with their work the process of taking services out of the poor-law and operating them under separate Acts would be developed. He had given a good deal of thought to the problem of out-relief and came to the conclusion that the Relief Regulation Order of 1911 required very drastic amendment if it was to be brought into any kind of relation with existing industrial conditions. The Relief Regulation Order, 1930, represented a substantial departure from the previous Order. The two principal changes were, first, that institutional relief was no longer to be regarded as the appropriate form of relief for the able-bodied. The second change had been to suggest that the conditions to the grant of relief should not have as their object merely a deterrent to the destitute person, but should be designed to maintain his morale and physique.

Increase in Sickness Claims.

He (Mr. Greenwood) gathered from what had been said in the press that there was a good deal of anxiety in the minds of hon. Members in regard to the increase of sickness claims under the National Health Insurance Act. The problem was, of course, a very serious one and had been occupying the mind of the Ministry of Health for some time. Two years ago the National Health Insurance Joint Committee authorised the Government Actuary to make an investigation into the substantial increase in recent years in claims for sickness and disability benefits. The Report of the Government Actuary was now in the hands of the Committee. In the meantime the department had been doing what it could in consultation with the approved societies to improve the supervision of claims and the selection of cases for reference to the regional medical officers. In 1928 there was a fall in the number of sickness claims from 1927, but in 1929, even after discounting the serious cases of influenza, there was a considerable rise over 1928. This year for the first three months there was an appreciable reduction, due primarily to the milder weather compared with last year, and the absence of an influenza epidemic. It was quite clear that further examination must take place into the problem. Suggestions have been made that there should be a Departmental Committee, but in his view such a committee would not be the proper body to deal with what was essentially a problem of administration. On the receipt of the report of the Government Actuary the National Insurance Joint Committee decided to extend the scope of the investigations and the whole question was now under the close attention of the officers, administrative and medical, of the insurance departments in all parts of the United Kingdom—England, Wales, and Northern Ireland. When their investigations had proceeded sufficiently far the approved societies would be brought into consultation, as would be the Insurance Acts Committee of the British Medical Association, and out of their investigations and deliberations he hoped that they might get some clearer opinion on what lay behind this very large increase in claims for benefit. He was convinced that there was no simple explanation of the increase. Precisely the same problem was arising in other countries which had fairly well-developed schemes of sickness insurance. In Germany, for example, the increase between 1927 and 1929 was 70 per cent. He did not wish to speak

too definitely as to the cause of the increase of claims in this country, but the prolonged trade depression was, he believed, one very important contributory fact. He thought if a person was ill and was not working he would go to the doctor, whereas if he had work he would work longer before going to the doctor. Another factor which seemed important, although it was difficult to assess its value, was that people were to-day seeking medical advice earlier than they used to do. In fact, the public had been urged repeatedly not to delay treatment, but to obtain it at the earliest possible moment. In so far as the increase in sickness claims was due to this it was to be welcomed for it meant in the long run an economy in the funds of the insurance societies. There were cases where owing to laxity of certification or administration persons were in receipt of benefit who were not properly entitled to it. It was clear that it was necessary for some societies to have a more effective sickness visitation and more discrimination of the cases going to medical officers. A new regulation was to be issued shortly which would enable effective disciplinary action to be taken where it was proved beyond doubt that practitioners had failed to exercise reasonable care in the issue of certificates. With a view to getting a more precise knowledge of the situation two separate tests were being conducted now. In the first place an analysis was being made of about 80,000 cases referred to the regional medical officers by a large number of societies throughout the country during 1929. Secondly, with the object of obtaining more precise knowledge as to the standard applied in interpreting the phrase "incapacity for work" an investigation was to be made shortly by officers of the insurance department covering a large number of persons in receipt of benefit on a particular day. By this means it was hoped to bring about a more uniform standard of certification throughout the country.

Mr. Greenwood then proceeded to review the measures being taken to reduce maternal mortality and tuberculosis. A report of the rest of his speech and of the subsequent debate will appear in the next issue of THE LANCET.

HOUSE OF COMMONS.

TUESDAY, APRIL 29TH.

Five-day Week and the Health of Workers.

Mr. KELLY asked the Home Secretary whether, from reports of his inspectors, he had information as to the number of firms working a five-day week; what effect this had on the health of the workers: and whether this method of working had been of advantage to the trades and industries.—Mr. CLYNES replied: I have no exact information as to the extent to which the five-day week has been adopted, but reports show that there has been some increase in the number of firms working this system. The system has not, however, been adopted sufficiently widely to enable the Factory Department to form any reliable opinion as to its effect on the health of the workers. As to whether this method of working has been otherwise of advantage to industry, I can only say that certain firms have made the statement that output has improved as a result of its adoption, and there seems to be no tendency to revert to the old system once the five-day week has been adopted.

CITY OF LONDON MENTAL HOSPITAL.—Last year 221 patients were admitted to this hospital at Stone, near Dartford, in Kent; at the beginning of the year there were 655 inmates; 151 left and 56 died. The demand for private accommodation at a cost varying from £1 8*s.* to £5 5*s.* per week was greater than could be met. The weekly sum charged for the maintenance of rate-aided patients was £1 6*s.* 10*d.*; the average all-round weekly cost was £1 8*s.* 11½*d.*

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION.—A four weeks' course in dermatology begins at the St. John's Hospital, Leicester-square, on May 5th; it consists of clinical instruction every afternoon and evening, and four lectures a week. Special practical pathology can be arranged. A course of evening lectures in preparation for the M.R.C.P. examination will be held from May 13th to July 4th. It consists mainly of lectures on Tuesdays and Fridays at 8.30 P.M. in the lecture room of the Medical Society of London, Chandos-street, Cavendish-square. Other special courses during May are as follows: diseases of the chest at the Victoria Park Hospital, all day from May 12th to 24th; ophthalmology at the Central London Ophthalmic Hospital, afternoons from May 19th to June 7th; diseases of children at the Hospital for Sick Children, mornings from May 26th to June 7th; and medicine, surgery, and the specialties (with special reference to tuberculosis) at the Queen Mary's Hospital, Stratford, from May 26th to June 7th. Copies of all syllabuses and information on post-graduate work are obtainable from the Fellowship at 1, Wimpole-street, London, W.1.

Medical Diary.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

TUESDAY, May 6th.—5.30 P.M., ORTHOPÆDICS. (Cases at 4.30 P.M.) Annual General Meeting: Cases will be shown.

WEDNESDAY.—5 P.M., HISTORY OF MEDICINE. Annual General Meeting. A paper by the late Mr. M. Ferguson on Alexis of Piedmont and his Secrets will be read. 8.30 P.M., SURGERY. Annual General Meeting.

THURSDAY.—8.30 P.M., NEUROLOGY (Specimens will be shown at 8 P.M.). Annual General Meeting. Dr. L. S. Kubie: Theoretical Application of the Properties of Circus Movements of Some Neurological Problems. This will be followed by a discussion of the pathological exhibits.

FRIDAY.—5.30 P.M., CLINICAL. (Cases at 4.30 P.M.) Annual General Meeting. Cases: Dr. H. V. Morlock: Hæmophilia Treated by Liver Diet. Dr. D. C. Hare: Massive Œdema of One Leg; for Diagnosis. Dr. E. C. Warner: A Case of Grave Hæmolytic Anæmia in a Child Cured by Liver Extract. Other cases will be shown. 9 P.M., GENERAL MEETING OF FELLOWS. Prof. John Murdoch (Brussels) will give a lecture on Radium Treatment of Cancer. The President (Lord Dawson) will take the chair.

SATURDAY and SUNDAY.—BALNEOLOGY and CLIMATOLOGY. Annual Provincial Meeting at Torquay.

MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES, 11, Chandos-street, Cavendish-square, W.

THURSDAY, May 8th.—8.30 P.M., General Meeting. Mr. Jocelyn Swan: Paper on Strictures of the Urethra. A Discussion will follow.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY, May 5th, to SATURDAY, May 10th.—CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, W.C. All-day course of instruction (Clinical) in diseases of the Ear, Nose, and Throat for three more weeks.—MAUDSLEY HOSPITAL, Denmark Hill, S.E. Course in Psychological Medicine. Clinical Practice of the Hospital and Special Lectures Daily. Proportionate Fee for Remaining Three Weeks.—ST. JOHN'S HOSPITAL, Leicester-square, W.C. Every afternoon, clinical instruction and lectures on Diseases of the Skin.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.

MONDAY, May 5th.—2.30 to 5 P.M.: Medical, Surgical, and Gynæcological Clinics. Operations.

TUESDAY.—2.30 to 5 P.M.: Medical, Surgical, Ear, Nose, and Throat Clinics. Operations.

WEDNESDAY.—2.30 to 5 P.M.: Medical, Skin, and Eye Clinics. Operations. 4.30 P.M.: Dr. J. Browning Alexander: Special Lecture on the Treatment of Diabetes.

THURSDAY.—11.30 A.M.: Dental Clinics. 2.30 to 5 P.M.: Medical, Surgical, Throat, and Ear Clinics. Operations.

FRIDAY.—10.30 A.M.: Ear, Nose, and Throat Clinics. 2.30 to 5 P.M., Medical, Surgical, and Children's Diseases Clinics. Operations.

WEST LONDON HOSPITAL POST-GRADUATE COLLEGE, Hammersmith, W.

MONDAY, May 5th.—10 A.M., Dr. Dowling: Skin Department. 11 A.M., Mr. Tyrrell Gray: Surgical Wards. 2 P.M., Mr. Sinclair: Surgical Wards.

TUESDAY.—10 A.M., Medical Registrar: Medical Wards. 2 P.M., Mr. Hamblen Thomas: Throat, Nose, and Ear Dept. 2.30 P.M., Sir Henry Simson: Gynæcological Operations.

WEDNESDAY.—10 A.M., Dr. Burnford: Medical Wards. 2.30 P.M., Mr. Donald Armour: Surgical Wards. Dr. Scott Pinchin: Medical Out-patients.

THURSDAY.—11.30 A.M., Mr. Simmonds: Demonstration of Fractures. 2 P.M., Mr. Bishop Harman: Eye Department. 2 P.M., Mr. MacDonald: Genito-Urinary Department.

FRIDAY.—10 A.M., Dr. Pritchard: Medical Wards. 2 P.M., Mr. Vlasto: Throat, Nose, and Ear Department. 2 P.M., Mr. Sinclair: Operations.

SATURDAY.—9 A.M., Mr. Vlasto: Throat, Nose, and Ear Operations. 9.30 A.M., Dr. Burnford: Bacterial Therapy Department. 10 A.M., Dr. Owen: Medical Children's Department.

Daily, 10 A.M. to 5 P.M., Medical, Surgical, and Special Out-patients, Operations, Ward Visits, Anæsthetic Courses.

BRITISH INSTITUTE OF RADIOLOGY, 32, Welbeck-street, W.

THURSDAY, May 8th.—6 P.M., Prof. John Murdoch (Brussels): The Problems of Dosage in Radium Therapy.

KING'S COLLEGE, Strand, W.C.

WEDNESDAY, May 7th, and following THURSDAY and FRIDAY.—5 P.M., Prof. J. A. Gunn: Pharmacological Reactions of Involuntary Muscle. (Free lectures.)

UNIVERSITY COLLEGE, Gower-street, W.C.

WEDNESDAY and THURSDAY, May 7th and 8th.—5.30 P.M., Prof. F. J. Cole: The Early History of Generation and Comparative Anatomy. (First and Second of six free lectures.)

ST. MARY'S HOSPITAL INSTITUTE OF PATHOLOGY, W.

THURSDAY, May 8th.—5 P.M., Dr. W. E. Gye: The Action of Antiseptics on the Virus of Filtrable Tumours.

CITY OF LONDON MATERNITY HOSPITAL, City-road, E.C.
TUESDAY, May 6th.—5 P.M., Dr. J. A. Willett: Lessons Learned from Emergency Admissions.

LONDON SCHOOL OF DERMATOLOGY SUMMER COURSE, 49, Leicester-square, W.C.
MONDAY, May 5th.—5 P.M., Dr. S. E. Dore: Animal Parasites.
TUESDAY.—5 P.M., Dr. H. W. Barber: Alopecia Areata and Vitiligo.
THURSDAY.—5 P.M., Dr. A. C. Roxburgh: Differential Diagnosis of Some Common Skin Diseases.
FRIDAY.—5 P.M., Dr. G. B. Dowling: Skin Diseases due to Protein Sensitisation.

GREAT NORTHERN HOSPITALS POST-GRADUATE LECTURES.
WEDNESDAY, May 7th.—3.15 P.M. (at the Royal Chest Hospital, City-road), Dr. James Maxwell: Bronchial Carcinoma.

MANCHESTER ROYAL INFIRMARY POST-GRADUATE COURSE.
TUESDAY, May 6th.—4.15 P.M., Dr. W. Fletcher Shaw: Displacements.
FRIDAY.—4.15 P.M., Dr. E. W. Twining: Radiological Demonstration.

UNIVERSITY OF SHEFFIELD POST-GRADUATE LECTURE.
TUESDAY, May 6th.—8.45 P.M. (in the Physics Department of the University of Sheffield), Dr. J. Murdoch (of Brussels): Radium Therapy in Cancer.

UNIVERSITY OF LEEDS MEDICAL SCHOOL.
WEDNESDAY, May 7th.—3.30 P.M., Dr. J. Murdoch: What Can we Expect from Radium in the Treatment of Cancer?

GLASGOW POST-GRADUATE MEDICAL ASSOCIATION.
WEDNESDAY, May 7th.—4.15 P.M. (at the Victoria Infirmary), Mr. W. A. Sewell: Surgical Cases.

Appointments.

EVANS, MARY, M.B., Ch.B. Manch., has been appointed Assistant Medical Officer of Health, Ashton-under-Lyne.

M'LACHLAN, A. D., M.B., Ch.B. Glasg., Lecturer on Diseases of the Skin, Anderson College, Glasgow.

MACMILLAN, A., M.B., Ch.B. Glasg., D.P.H., Assistant County Medical Officer of Health, Derby.

STOUPE, NORA E., M.B., Ch.B. Belf., House Surgeon to Tyrone County Hospital.

London Lock Hospital and Home: WILLIAMS, R. L., F.R.C.S., Surgical Registrar to the Male Lock Hospital; SANDES, GLADYS, M.B., B.S. Lond., Surgical Registrar to the Female Lock Hospital; RAWLINGS, E. S., M.R.C.S., L.R.C.P., First House Surgeon to the Male Lock Hospital; FIRTH, J. S., M.B., Ch.B., Second House Surgeon to the Male Lock Hospital; and CLARK, ADAMS, M.B., B.S., Second House Surgeon to the Female Lock Hospital.

Certifying Surgeons under the Factory and Workshop Acts: KING, F., M.B., Ch.B., Leeds (Halifax); and RANKIN, A. H., M.B., Ch.B. Glasg. (Eckington, Derby).

Vacancies.

For further information refer to the advertisement columns.

Ashton-under-Lyne District Infirmary.—H.S. At rate of £150.
Bath, Royal United Hospital. H.P. £120.
Belfast, Ulster Hospital for Children and Women.—Hon. Asst. S.
Borneo.—M.O. £750.
Bristol, Blagdon, Nordrach-upon-Mendip Sanatorium.—A.M.O.
Bristol Royal Infirmary.—Hon. Reg. for Ophthalmic Dept.
Central London, Throat, Nose, and Ear Hospital, Gray's Inn-road, W.C.—Res. H.S. At rate of £75.
Chester, County Mental Hospital.—Jun. Asst. M.O. £350.
Derbyshire Royal Infirmary.—Ophth. H.S. and Res. Anæsthetist. £150. Hon. Asst. S. Also Hon. Asst. S. to Ear, Throat, and Nose Dept.
Downpatrick, Down Mental Hospital.—Jun. Asst. M.O. £300.
Elizabeth Garrett Anderson Hospital, Euston-road.—H.P., Obstet. Asst., Three H.S.'s. Each at rate of £50.
Evelina Hospital for Children, Southwark, S.E.—H.S. At rate of £120.
Glasgow Royal Infirmary.—H.P.'s and H.S.'s.
Gloucestershire Royal Infirmary and Eye Institution.—2nd H.S. At rate of £100.
Great Yarmouth General Hospital.—Jun. H.S. At rate of £125.
Halifax Royal Infirmary.—3rd H.S. At rate of £100.
Hammersmith Metropolitan Borough.—Tuberculosis Officer, &c. £750.
Hove, Lady Chichester Hospital.—Jun. H.P. At rate of £50.
Haverstock General and North West London Hospital, Haverstock Hill, N.W.—Cas. M.O. and Cas. Surg. O. Each at rate of £100.
Huddersfield Royal Infirmary.—H.S. At rate of £150.
Hyde, Borough of.—Asst. M.O.H. (Part-time). £300.
India, Cachar District.—M.O. Rs.1200 per month.
Inverness, Northern Infirmary.—H.P. £100.
Jerusalem, St. John Ophthalmic Hospital.—Registrar.
Kingston-upon-Thames, Surrey County Mental Hospital Service.—Jun. Asst. M.O. £350.
Leicester Royal Infirmary.—3rd Res. Anæsthetist. At rate of £250. Also Hon. Surg.
London Jewish Hospital, Stepney Green, E.—Hon Reg. to Ear, Nose and Throat Dept. Also Res. M.O. and Jun. Res. M.O. At rate of £150 and £100 respectively.
London Temperance Hospital, Hampstead-road, N.W.—Cas. O. At rate of £120.
London University, Chair of Physiology.—£1000.
Manchester Royal Children's Hospital, Gartside-street.—Sen. M.O. £300.
Manchester, Withington Hospital and Institution.—Three Asst. M.O.'s. Each £275.
Manor House Hospital, Golders Green, N.W.—H.S. At rate of £200.
Middlesex Hospital, W.—Asst. Surgeon.
Oldham County Borough.—Asst. M.O.H. and Clin. Tub.O. £750.
Plymouth, City and Port of.—Asst. M.O.H. £750.
Preston Institution, Fulwood.—Jun. Res. M.O. At rate of £104
Royal Free Hospital, Gray's Inn-road, W.C.—Asst. Surg. to Ear, Nose and Throat Dept. Also Res. Anæs.
Royal Northern Hospital, Holloway, N.—H.S. at rate of £70.
Salford City.—Asst. M.O. for Maternity and Child Welfare. £600.
Salford Royal Hospital.—H.P., also Cas. H.S. Each at rate of £125.
Sheffield Royal Hospital.—Res. Ophth. H.S. Also Res. Anæsthetist. Each at rate of £80.
Sheffield Royal Infirmary.—Asst. Cas. O. At rate of £80.
South Africa, Kimberley Hospital.—Radiologist and Physician for X Ray, Massage and Electrical Depts. £900.
South Eastern Hospital for Children, Sydenham, S.E.—Asst. and Res. M.O.'s. At rate of £100 and £75 respectively.
Southampton, Royal South Hants and Southampton Hospital.—Asst. H.S. At rate of £140.
Southern Rhodesia Medical Service.—Three Asst. and Relieving Government M.O.'s. £500.
Wakefield, Clayton Hospital.—Two H.S.'s. Each at rate of £200.
Wakefield, Middleton-in Wharfedale Sanatorium.—Res. Asst. M.O. £350.
Walsall General Hospital.—Sen. H.S. At rate of £200.
Warwick, Warwickshire King Edward VII. Memorial Sanatorium, Hertford Hill.—Med. Supt. £800.
West London Hospital, Hammersmith, W.—Hon. Surg.
Weymouth and District General Hospital.—H.S. £180.
Whipps Cross Hospital, Whipps Cross-road, Leytonstone, E.—Anæsthetist. £300.
Willesden General Hospital, N.W.—H.P. £100.
Woolwich and District War Memorial Hospital, Shooters Hill, S.E.—H.S. At rate of £125.
Wolverhampton Royal Hospital.—H.P. At rate of £150.

The Chief Inspector of Factories announces a vacant appointment for a Certifying Factory Surgeon at Okehampton (Devonshire).

Births, Marriages, and Deaths.

BIRTHS.

HEAL.—On April 24th, at Exeter, the wife of Dr. J. C. Heal, of a son.

TUSTIN.—On April 23rd, at Templecombe, Somerset, the wife of Dr. E. Melville Tustin, of a daughter.

MARRIAGES.

BAIN—PEASE.—On April 22nd, 1930, at St. John's Church Bishop Monkton, by The Rt. Rev. The Lord Bishop of Ripon, The Rev. Paul de Labilliere, and The Rev. J. Woods, Cyril William Curtis Bain, *M.C.*, M.B., M.R.C.P., St. Anns, York-place, Harrogate, to Diana Alice, youngest daughter of Lieut.-Col. and Mrs. Pease, Park Hill, Harrow.

BERGH—SLATER.—On April 26th, at St. Michael's Church, Sutton Court, Chiswick, Henry John Walter Bergh, M.R.C.S., L.R.C.P., elder son of Mr. and Mrs. F. R. Bergh, of Chiswick, to Gladys Kate, younger daughter of Mrs. K. E. Slater, also of Chiswick.

MCCURRY—CARMICHAEL.—On April 21st, at St. Peter's Church, Harrogate, by the Vicar, the Rev. J. M. Cunningham, Arthur L. McCurry, M.D., 7, De Montfort-street, Leicester, son of the late Joseph McCurry and Mrs. McCurry, 23, Wellington-park, Belfast, to Kathleen, widow of James Carmichael, Leicester, daughter of the late Elijah Salthouse and Mrs. Park, Kingsmeade, Arnside, Westmoreland.

NEILSON—GLYNN-OUSELEY.—On April 25th, at St. Michael's Church, Chester-square, S.W.1, by the Rev. Canon Mitchell, Dean designate of Lincoln, Drevor Frederick Acton Neilson, F.R.C.S., elder son of Dr. Henry J. Neilson, C.B.E., and Mrs. Neilson, of Inchcape, Woking, to Celia Glynn-Ouseley, younger daughter of Mr. and Mrs. Gore Glynn-Ouseley, of Blakesware, Teddington.

PICKERING—SEWARD.—On April 26th, at St. Benedicts' Church, Cambridge, George White Pickering, M.B., M.R.C.P., of Newcastle-on-Tyne, to Mary Carola Seward, youngest daughter of the Master of Downing College and Mrs. A. C. Seward.

STEWART—CROSS.—On April 19th, at St. Peter's Church, Bournemouth, Major Pat Adam Stewart, R.A.M.C., to Enid Gwendoline Cross, only daughter of Mr. and Mrs. Edgar Cross, The White Lodge, Bournemouth.

DEATHS.

COLT.—On April 23rd, following an operation, Thomas Archer Colt, O.B.E., L.R.C.P., M.R.C.S., of "Trawscoed," St. Edwards-road, Southsea, aged 78.

WILLIAMSON.—On April 24th, after three days' illness, Mildred Beatrice Williamson, Assistant Secretary to the Royal Society of Medicine.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Comments, and Abstracts.

SHOULD MEDICINE BE A MENDICANT?

A REVIEW OF OUR HOSPITAL SERVICE.

Harveian Lecture delivered at the Harveian Society of London on March 13th

BY ERNEST W. HEY GROVES, F.R.C.S. ENG.,
PROFESSOR OF SURGERY IN THE UNIVERSITY OF BRISTOL.

MORE than 320 years have passed since William Harvey was appointed to be the assistant physician and shortly afterwards to be the full physician in St. Batholomew's Hospital. It was on Oct. 14th, 1609, that he accepted a charge which enjoined him to attend the hospital at least one day a week, to take no gift or reward of any of the poor, and to be answerable to God as a faithful physician. We are tempted to wonder what this great scholar and gentleman would think if he could revisit his old hospital to-day.

What William Harvey would Think.

He would find a great light shining from its roof to attract men's gaze, a great cry for money to pay for the buildings, whilst papers and hoardings proclaim the same desperate need for financial help. We can almost hear him saying: "In God's name what has happened to this England and to my most revered hospital? Are there so many more poor than there used to be—or have the benefactions of the rich been stolen or diverted?" We should have to say that, on the contrary, the poor as they were known in 1600 hardly exist to-day, and that the people of England were never so rich and give more to hospitals than was paid in those days for all the national revenue.

We may now discuss whether it is well that all our great hospitals, even including that venerable, ancient, and dignified institution founded by Rahere, should be forced into the position of a needy mendicant asking for alms.

The provision and organisation of a perfect hospital and a perfect hospital system has come to be the great aim and ideal of everyone interested in medical practice, science, or education. To have a perfect hospital and to be one working unit in this perfect thing is, or ought to be the secret, or acknowledged ambition of every medical student and medical practitioner in the country.

If you would interrupt me by pointing out that only a very small proportion of practitioners can belong to hospital staffs, I would welcome your interruption by saying that no matter how isolated and remote the practitioner is, or how engrossed in general practice, yet he ought always to be in real active touch with some hospital, for his own good and for that of his patients. In fact I would go further, and say that remoteness and busy-ness are the most urgent reasons why the practitioner should be in close touch with a hospital where the organised coöperation of his fellow-workers is prepared to give stimulus and help to the seeker and in return asks for a contribution to knowledge and assistance in carrying on work begun in hospital, in the patient's own home.

I say, then, that to the idealist, the hospital we strive for should be a high and holy thing, the very temple of medical truth where we reverently handle the mysteries which have been taught us and earnestly endeavour to search out the secrets of infinite nature, hoping each one of us to serve humanity faithfully, and of having, perhaps, the greatest of rewards in finding some treasure in the storehouse of truth, which we may hand on to those who come after us, to be incorporated by them into the greatest ritual of our religion, which is the service of suffering and the quest of health.

Appealing to Sentiment.

Have I got you into the mood I wanted about our profession and its highest expression of learning, teaching, of research and alleviation of suffering—the hospital? If so, then I am ready to ask the question which forms the title of this address—should medicine be a mendicant?

The old picturesque beggar has almost disappeared from our streets, because by a peculiar irony, that very phase of our civilisation, which has made begging the cherished hobby of the well-to-do has made it illegal for the professional beggar to ply his trade! Even in Italy where but a few years ago begging seemed to be the most popular of vocations, it has now almost disappeared.

Good government and prosperity, and, above all, natural self-respect, have decreed that begging must go—and gone it is. But personal begging is not so remote in this country nor countries in which it still flourishes, so distant that there is any difficulty in picturing its methods and morals. You are accosted in some quiet street by a slouching figure of a man, who has trailing in his wake a bedraggled woman, clutching in her arms a whining child. In terms it may be of snivelling humility, or it may be of truculent menace, you are invited to contribute to the maintenance of this wandering trio. The mendicant, if he is skilled in his art, suits his tone to his hearer, and pleads that it is for his weary wife and hungry child that he is asking help. They have walked an incredible number of miles, have had nothing to eat for days, and unless the child has costly doctor's care it will not live another day. Our feelings on hearing or trying not to hear this appeal are usually those of instinctive distrust and scepticism, resulting from experience. We feel pretty certain that the man is a lazy ruffian, trading on the pitiful condition of the woman and child that he takes with him, in order to get money by begging rather than by working. But it is so much easier to cut short the unpleasant interview by giving the man the money he asks than to refuse or to investigate—that the money is given and the mendicant is confirmed in his shiftless life. Instinct and reason alike counsel that we should refuse. We know quite well that if no one gave the beggar money he would be forced to work. We know that the money given probably goes in drink, that the baby is hired for the purpose of exciting pity, and in short we know full well that mendicancy is a degraded and a degrading thing. The essential method of begging is to make an appeal to sympathy and sentiment rather than to reason, to press urgency of need, so that there may be no time for inquiry; the usual result of begging is indefinitely to prolong the unhappy conditions which are supposed to be relieved. The great art of successful begging is to extort money from people who do not want to give it, and having done this, to represent the transaction as one of voluntary charity. The whole affair being one dictated by pity and carried out by charity cannot be questioned by reason or scrutinised as if it were a business matter. Having once given your money to the beggar, you have no manner of right to dictate to him how he shall spend it.

Our own British hospital system is dependent upon mendicancy. This applies to the oldest institution and those with the finest tradition for service to the community, and to all the hospitals which are responsible for teaching and research. By a curious misuse of terms these hospitals so dependent upon the bondage of mendicancy are called the voluntary hospitals. At the very outset of our criticism of the mendicant hospital system we must face the claims so often made on its behalf—that it has been a wonderful success—so much so, that we are told that people are actually proud of it. Well, I can only say it does not take much to make some people proud!

Its Amazing Success.

As a matter of hard cash results we must concede that hospital mendicancy has achieved an amazing record. I find on the authority of Burdett that 25 years ago the voluntary hospitals received just under £2,000,000 (£1,985,840 in 1903), but that now the year's income is over 14 millions (£14,006,585 for 1928), more than a sevenfold increase in a quarter of a century! And this at a time when taxation, imperial and local, was never so high, and in the very country where this taxation is higher than anywhere else in the world! It is only because the mendicant method has grown so insidiously that it is tolerated for a moment by sensible people. If anyone will seriously argue that mendicancy is good, then why not extend it to other services of the country? Can we imagine education, the legal service, or civil service being dependent upon haphazard philanthropy and appeals by advertisement?

We might without risking any immediate calamity make the expenses of Ministers and the salaries of Members of Parliament the subject of the voluntary system. The Home Secretary, Chancellor of the Exchequer, the local Member of Parliament, and all the upkeep of the Houses of Parliament would depend for their income on flag days, Parliament Sundays, or upon the wiles of their publicity agents—what an alluring prospect, and yet it is just that we are doing for the hospital service. I venture to say that whereas the hospital is essential for the welfare of the community and could not be dispensed with for a single day, there are many who would view the prospect of being without a Parliament for a few years with the utmost equanimity.

I am not concerned over much for saving the pockets of the people, who pay taxes because they must, and give to charitable appeals because they like. It is obvious that the British public like sentimental appeals, whether by great men and women in high places, by famous people on the wireless, and by the most expert advertisers in the Press or on the hoardings. I feel quite sure that if and when the planet Mars is within easy communication with us, that a charitable appeal will be organised in this country to feed

or to clothe or to doctor the needy Martians, and, of course, the appeal will meet with wonderful success. No! the justification for the mendicant system is not established merely by pointing to the fact that so many millions can be obtained by begging—we have to ask whether the system is efficient at present—is likely to be adequate in the future. Begging for the sick poor may have been the best that could be done in days gone by, but it is manifestly failing to-day to provide what is wanted, and which in other countries is actually being provided by other means.

Increasing Complexity of Hospital Service.

One hundred years ago the hospital problem was a comparatively simple one. The sick poor had to be fed and tended whilst he was ill, he was visited by a doctor and ministered to by a clergyman. It was merely a question of providing enough beds, enough nurses, doctors, and clergy. In fact in those days it was but little more than a money problem. Get the money from the charitable public and spend it on the sick poor, counting all the time on the medical profession to give their services for the good cause. But since that time and almost within the life-time of the present generation, the problem has become much more complicated. Instead of merely tending the sick man, scientific knowledge has proved that it is often possible to cure him, and generally possible to alleviate his sufferings. It has been discovered that the cause of disease can be found out, and sickness often prevented.

A highly complex service of preventive and curative medicine and surgery has taken the place of the merely palliative system of tending the sick man. So that the fact is quite evident that the size and complexity of the hospital problem have so rapidly grown as to be far beyond the competence of any philanthropy, whether we call it voluntary or mendicant, to support.

The poor-law guardians have always had many beds for the sick and infirm, but in recent years they have steadily increased the number of beds and improved the character of their buildings, and have distinguished between the sick poor who required active medical and surgical treatment and those who merely need a shelter and an asylum. In most of our large cities at the present moment there are as many hospital beds provided by the municipal authorities as those under the control of voluntary organisations. Of available beds for the treatment of the sick the voluntary institutions have fallen short by about 50 per cent. of the requirements of the community.

It would not, of course, be a fair representation to say that the voluntary hospitals only do about half the work needed, because in respect to the number of cases treated as in-patients, and in respect of out-patients they are still a long way in advance of the municipal institutions. But the outstanding fact remains that in the mere matter of providing enough hospital beds the voluntary system has failed, so that it can only accomplish one-half of what is wanted.

In regard to the number of beds the challenge and growth of the municipal hospitals is far the gravest indictment of the voluntary system. But it is also manifest that when special scientific discovery has made provision of segregated groups of hospital beds necessary, then the demand for such by the community cannot be met by the voluntary hospitals and the health authority is compelled to provide county or municipal institutions for these purposes. Thus acute specific fevers, and then pulmonary tuberculosis, later surgical tuberculosis and venereal disease have had to be put into special public institutions or provided for by the State. This is merely another instance of the fact that the voluntary system is not equal to meeting the requirements of the community. It cannot do so in the matter of the number of beds, it cannot do so in respect of the requirements of special diseases.

The inadequate provision of beds by the voluntary hospitals is most clearly shown by the very long lists of patients waiting for admission, and the known fact that many of these have to wait months before they are admitted. One provincial hospital alone has 3000 patients on its waiting-list. Some of these are patients suffering from malignant disease for whom delay means a loss of what slender chance they have for cure or alleviation, others are working men, who are thrown out of work during all the waiting period. From an economic point of view much more money is spent in supporting these men whilst out of work than would be needed to pay full maintenance fees for them in hospital for three or four weeks. It would probably be an under statement of the facts if we were to say that at the present moment there are 10,000 people waiting for admission to the voluntary hospitals, and that 5000 of these will suffer in money, health, and prospect of recovery from this delay in the treatment of their case. This outstanding fact, that the voluntary hospital system which was competent to meet the needs of the community 30 years ago is now quite inadequate, is due not to any alteration in the economic situation, or to the increase of the population, or to the greater number of sick people. Actually the income of the voluntary hospitals has by its sevenfold increase far outstripped the increase in population, cost of living, or morbidity.

Two Fundamental Changes.

There have been two fundamental changes in the relationship between the supply and demand of hospital service which not only account for the failure of the voluntary system, but which make it clear that mendicancy is not only inadequate, but also unsuitable and indecent. These two changes have come about so gradually that their importance has been overlooked.

In the first place medical practice, both in regard to diagnosis and treatment, has become so complex that it requires to be carried out in a scientific institution, provided with apparatus and personnel suitable for scientific work. In other words, a sick or injured person will require a properly equipped institution for his recovery. The second change follows naturally from the first. If the care of the sick and injured requires scientific institutions then this need will be equally great for the rich as for the poor, for the self-supporting as well as for the indigent.

This may be illustrated by two common conditions requiring medical or surgical attention. The first a case of dyspepsia. The patient will require to have his history taken by an experienced practitioner, he will be referred to a biochemist or pathologist to report on the chemical changes of his gastric contents and the presence of occult blood and other changes in the fæces, he must be examined by an expert radiologist to know whether the mobility of the stomach, duodenum, and intestines is normal or abnormal and whether there is any ulcer or growth to be seen; if a removable cause for the dyspepsia is found he will require the services of an anæsthetist, a surgeon, and an assistant surgeon to perform the necessary operation, whilst his after recovery will depend upon the skill of a house surgeon, a sister, and a nurse. So that this one case needs the services of no less than nine specially trained people whose work will be much more satisfactory if they are accustomed to act together as a well-trained team.

The other instance is that of a man run over in the street and suffering from an infected open fracture. His treatment will require the immediate services of a house surgeon, with one or two dressers, the administration of an anæsthetic, the administration of anti-tetanic and anti-gas sera, the examination of his wound secretion by a pathologist, provided with a laboratory and staff of assistants. Later he will want the help of a surgeon for manipulation or splinting of the fracture, and perhaps he will want a bone-grafting operation, which can only be done with the best chance of success by a specialist who has had adequate experience of this work, and who must be able to rely upon the help of a trained assistant and nurses with special knowledge. Again this means the need of eight or nine highly skilled persons accustomed to work together as a team.

Gravity of Illness, not Poverty.

This I believe to be the crux of the whole problem. The raison d'être of the voluntary hospital was the idea of relief of the sick poor. The need of the present hospital system is to provide adequate investigation and treatment of disease for the whole community. It may have been the right and proper thing to accept the rich man's gifts and to supplement these by begging alms to help the sick poor, but by no possible reason can justification be found for making a charity of the application of modern science for the needs of the middle classes or the rich. The total number and relative proportion of the very poor people is much less than it was, but the need for hospital beds is much greater. This is not because people with money wish to become the objects of charity, but because any man, whatever his means, knows quite well, and his doctor tells him that if he is seriously ill he must enter a hospital, so that he shall have the full investigation, nursing, and treatment that can only be provided in a scientific institution. This cardinal fact, that the gravity of the illness or the danger of the injury which the patient suffers and not his poverty constitutes the chief claim he has to admission to a hospital is shown in various ways. The police and the street ambulance take every serious case of accident straight to the nearest hospital.

In some places, if the patient is a well-to-do man, he is kept for treatment, and a suitable donation to the charity is expected of him, in others he is transferred to a private nursing home as soon as possible. In a very few he is put into a private ward and pays his way, both to hospital and to medical staff. If a man injured in a street motor accident is taken to a nursing home then the expenses of his stay there and all fees for medical attendance become a claim against some insurance company, which is met, generally, without demur. But if the same man is taken to a hospital and receives the same attention, there is no claim either for

maintenance, nursing, or surgical attendance, because the patient is the recipient of charity!

The managers of most voluntary hospitals, partly driven by necessity to raise funds and partly because they know that most of the patients are by no means destitute, have instituted a charge to all their patients of about £1 a week, which is modified or remitted if the patient cannot pay. The voluntary system has indeed changed its character in attempting to carry out a task for which it was never intended, and for which it is quite unfitted. Only a certain portion of the funds can now be described as the product of free-will—the rest is literally extorted from a reluctant and over-taxed population. Most of the patients have to pay a contribution towards their maintenance, and an increasingly large number have their entire maintenance provided by a contributory insurance scheme.

In fact the only element of the original "voluntary" plan which remains in its pristine beauty is that the visiting medical staff still give their services for nothing! As a matter of fact in the old days it was not considered beneath the dignity of the physician to receive a salary for his hospital appointment. Harvey himself accepted £33 6*s*. 8*d*. a year for one day's attendance per week. The sum named would be the equivalent of about £100 of our money, and thus visiting members of a hospital staff should, if this old tradition had been maintained, receive about £400 or £500 for attendance on four or five days a week at a hospital.

One of the stock arguments against the municipalisation of hospitals is that this would involve paying the doctors. In the recent report of the Royal Commission, inquiring into the working of the National Health Insurance Act, this very point is discussed. This Act produces each year a large surplus, and it would seem obvious that this might be used to pay hospital charges of insured persons who need institutional treatment. But if this were done then the doctors who now work for nothing would expect to be paid—and that, of course, would be a waste of public money which no Royal Commission could possibly contemplate!

So that we are faced with this rather startling position—that there is an available fund for paying for patients in hospital, but that to pay this money for such a purpose would not be prudent because then public admission would have to be made that most hospital patients are not destitute poor, but the well-cared-for children of a wealthy State, and in addition to their maintenance in hospital, further funds would have to be found to pay the men who are doing the healing work. Why on such lines hospitals might even become self-supporting, and then what would become of the "voluntary system"? Large sums of money would be scandalously wasted in paying a profession that now works without payment, and the poor over-worked publicity agents who organise hospital appeals would be thrown out of their job!

Exploitation of the Medical Profession.

This is a definite part of the mendicant system. It has grown up so gradually that it has hardly been noticed. It has been accompanied by so much unctuous flattery of the profession that very few have cared to raise a protest which would bring in no cash but might rob us of the glamour attaching to noble and disinterested philanthropists. Little more than a generation ago the position of the visiting staff of a hospital entailed but little work and responsibility. A visit to the hospital twice a week involving one or two hours, administering to destitute recipients of charity. Now I suppose it would not be an exaggeration to say that to-day the best type of hospital physician or surgeon spends quite half his working time at the hospital, and frequently is called there at night. He is actually applying the modern discoveries of science to the investigation and treatment of disease, and to the mitigation of those accidents of industrial life and modern travel which the use of machinery has caused. He is doing this for the working men and for their wives and children—for those who form the bulk of the most prosperous nation in Europe. And he is still expected to do this responsible work without any direct fee or reward.

But I should be digressing from my subject if I allowed myself to linger on this topic; the last thing in the world I would wish to do would be to make an ad misericordium appeal for the indigent consultant—although it would not be difficult to prove that this man is often denied the fair pecuniary reward of his work, such as is accorded to a man of like ability and independence who devotes himself to business pursuits. But it is necessary to point out how this demand that the consultant class should do so much of the essential work of the hospitals gratuitously does act against the best interests of the hospital service itself. It does so by seriously limiting the choice of the best men for the most important work in the medical service of the country. It makes it most difficult for any medical man or woman to aspire to a position of a hospital consultant, unless he or she is possessed of private means. If he has not got money or cannot marry money, then if he would come on a hospital staff he must for years enslave himself by various methods of making money, such as coaching students, taking various small paid appointments, or ingratiating himself with any general practitioner who is likely to give him private work. All this means that just when he is at his best he must be absorbed in the great problem of making a competency and he cannot devote himself to what ought to be his chief occupation of scientific pursuit. It is only natural, then, that after 10 or 15 years of struggle for existence, when he at last finds himself fairly affluent, he should have lost the zest for research or discovery, and be content to reap the harvest of his toil. We have then the explanation of the general spirit of laissez-faire, which possesses most of our hospital staffs. The younger men are engaged in the grim struggle for maintenance, and the older men are enjoying the fruits of prosperity; so that the former cannot and the latter do not want to disturb the existing state of things.

(*To be continued.*)

ROCKEFELLER MEDICAL FELLOWSHIPS.

FELLOWSHIPS for the academic year 1930–1931 will shortly be awarded by the Medical Research Council, and applications should be lodged with the Council not later than June 1st, 1930. The Fellowships are provided from a fund with which the Council have been entrusted by the Rockefeller Foundation. They are awarded by the Council to graduates who have had some training in research work in the primary sciences of medicine or in clinical medicine or surgery, and are likely to profit by a period of work at a university or other chosen centre in the United States before taking up positions for higher teaching or research in the British Isles. In special circumstances they may be tenable at centres of research not in America. A Fellowship held in America will have the value of not less than £350 a year for a single Fellow, with extra allowance for one who is married. Travelling expenses and some other allowances will be paid in addition. Full particulars and forms of application are obtainable from the Secretary, Medical Research Council, 38, Old Queen-street, London, S.W. 1.

THE ESSEX COUNTY SANATORIUM.

ON Saturday last, April 26th, Mr. Greenwood, Minister of Health, opened the County Sanatorium of Essex at Black Notley, a mile or two south of Braintree, in the presence of a distinguished gathering which included the High Sheriff, the chairman of the county council, and the deputy lieutenants of the county. The original county scheme for the treatment of tuberculosis, framed in 1912, provided for beds in various existing hospitals and private sanatoria. Later on the council built its own sanatoria at Harold Court for men, at Black Notley for women, at Sible Hedingham for children, and at High Beech for surgical tuberculosis. Shortly before the war it was decided to establish a large sanatorium and a site at Sandon was purchased for the purpose but ultimately relinquished. Finally an additional plot of land, 25 acres in extent, was acquired adjoining the existing sanatorium at Black Notley, and Welwyn Builders, Limited, began their work in July, 1928. The lay-out is of the familiar extended façade with south-easterly aspect, the centre of the scheme being the King Edward VII. Memorial Hall, which provides a place of recreation, with seating accommodation for nearly 200 persons. On the right are the two children's pulmonary pavilions with 25 beds each for boys and girls, and on the left two adult pulmonary pavilions each with 25 beds. All the buildings are of light construction, the walls of hollow brick slabs built on reinforced concrete raft, roofed with double Roman tiles, and with wide verandas, which in the case of the pulmonary pavilions have glazed skylights. Two surgical pavilions for 31 patients each occupy the northern portion of the site and are connected by corridors with the operating block, which contains theatre, anæsthetic, sterilising and plaster rooms with sections for X ray and light treatment. There is also an isolation pavilion with six single-bed wards. The school block consists of two large classrooms, the south walls formed by large folding doors admitting a maximum of light and air. The water-supply is from a deep well on the site, from which water is pumped to a tower. There is a dual system of drainage, surface water being discharged into adjacent streams, and the excreta being carried to two filter beds with revolving sprinklers, the effluent being irrigated over the land. Four tennis courts, two grass and two hard, have been laid down. There is a large garden and an area planted with fruit trees. The work was carried out from the designs of the county architect, Mr. John Stuart, F.R.I.B.A., at a total cost, including the site, buildings, services, and equipment, of £100,800.